

ST. LUCIE COUNTY LOCAL MITIGATION STRATEGY LMS

2016 UPDATE



And the
Town of St. Lucie Village

Updated: March 2016
In partnership with
St. Lucie County Department of Public Safety,
Division of Emergency Management
and the Treasure Coast Regional Planning Council

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UPDATES ACKNOWLEDGMENTS

Acknowledgements: Added references to information sources. Added full list of County municipalities. Added local government representative logos.

ACKNOWLEDGEMENTS

St. Lucie County Department of Public Safety, Division of Emergency Management engaged a number of community stakeholders and utilized a variety of data sources to conduct a comprehensive update to the St. Lucie County Unified Local Mitigation Strategy (LMS).

The LMS Steering Committee is comprised of organization representatives from four jurisdictions in St. Lucie County; St. Lucie County unincorporated; City of Port St. Lucie, City of Fort Pierce; and the Town of St. Lucie Village, the St. Lucie County School District, Florida Department of Health at St. Lucie County, Fort Pierce Utilities Authority, Fort Pierce Housing Authority, South Florida Water Management District, Fort Pierce Farms Water Control District, North St. Lucie Water Control District, Red Cross and Florida Forest Service. private firms and the public to develop strategies to prepare for disasters by means of mitigation and recovery activities.

In addition, information from the National Climatic Data Center; the National Oceanic and Atmospheric Administration (NOAA); National Weather Service; Hazus-MH; St. Lucie County's Information Technology Department, Building Department, and Engineering Department; Treasure Coast Regional Planning Council, the Local Emergency Planning Committee (LEPC); the Florida Forest Service, Florida Division of Emergency Management/Mitigation, and the Federal Emergency Management Agency (FEMA) to update this document with the "best available" climate and hazard vulnerability data.

UPDATES EXECUTIVE SUMMARY

- **Executive Summary:** updated and rewrote executive summary adding historical events and preliminary discussion on Steering Committee review and adoption process and stakeholder involvement.
- **Introduction:** Updated Table 1.0 - Planning Schedule; made grammatical and sentence structure revisions.
- **Overview:** Updated County population and added municipal population current numbers.
- **Historical Vulnerability:** Added language on events that led to the development of the LMS program; added discussion on Community Rating System (CRS), National Flood Insurance Program (NFIP) and the Flood Insurance Rate Map (FIRM); revisions to most recent natural disasters section.
- **Initial Hazards Identification:** added language on documents reviewed for LMS hazards update; added additional paragraphs to expand discussion on man-made, technological and societal hazards.
- **Initiating Action:** Added previous LMS adoption resolutions document numbers for dates 2005 and 2010.
- **Process/Findings/Plan Update:** expanded discussion in Process section, expanded Transportation section; revised sentence structure and formatting throughout sections.

EXECUTIVE SUMMARY

In 1992, Hurricane Andrew made landfall in South Florida causing an estimated \$27 billion in damages structurally, but cost the area even more economically and environmentally due to extended time to recover. 1997 was one of the driest years on record in Flagler County, and wildland fires caused evacuations, damage and more expense in the recovery phase. Osceola and Volusia counties experienced devastating tornadoes in the spring of 1997 destroying homes and killing several people in those communities. In 1999, the City of Port St. Lucie lost 50 homes consumed by wildland fires in urban interface. The 2004 hurricane season was record-setting and brought Floridians four hurricanes (Charley, Frances, Ivan and Jeanne) in just 44 days and causing over \$5 billion in property damage across the State. Natural hazards are not the only type of hazards that create disaster situations. The terrorist attacks of September 11, 2001 in New York City and Washington D.C changed disaster management forever forcing a more focused effort on mitigating and responding to technological hazards. Throughout the State, technological disasters occur daily - truck rollovers, communication failures, toxic and hazardous materials spills, wellfield and saltwater intrusion contamination.

These types of events, as well as other historic disasters, led the Florida Division of Emergency Management (FDEM) to create the LMS Program which is now carried on throughout FDEM. The goal of the LMS program is to encourage public and private sector entities to take actions that permanently reduce or eliminate long-term risk to population and property from various hazards faced by St. Lucie County communities creating a more resilient community in the wake of disasters. Pre-and post-disaster mitigation activities under a Unified LMS benefits the public and private sectors in the several ways and it is the intent of this Unified LMS to ensure planning and projects:

- reduce future vulnerability to disasters; and
- reduce time and costs of recovery from events when they occur; and
- minimize disruption to the local economy facilitating faster community recovery; and
- facilitate recovery and receipt of post-disaster funding; and
- Educate and inform the public about hazards and steps they can take to mitigate potential damage from disasters.

This is a multi-jurisdictional all hazards mitigation plan with a strategy identified by way of a Prioritized Project List (PPL), hazards and vulnerabilities risk assessment and outreach and education for the public. The planning effort has been conducted through coordinated, cooperative efforts of the local governments within St. Lucie County.

A draft will be presented to the LMS Steering Committee and made available for public review and comment. Once all Steering Committee and public comments and concerns have been addressed, the LMS will be submitted to the FDEM for review and approval. FDEM comments and edits will be incorporated. A public presentation will be held once the final draft Plan has been approved by the Steering Committee and FDEM. The public will have the opportunity to review the draft LMS Plan by hard copy and via the County website. One (1) hard copy of the plan will be placed at the County Administration building, one (1) copy at each County library (six (6) libraries), and one (1) hard copy to the City of Port St. Lucie City Hall, City of Fort Pierce City Hall and Town of St. Lucie Village City Hall. In addition, the County website will post the draft plan for two (2) weeks and accept electronic comments.

This comprehensive update will be submitted to the FDEM, who has the authority to approve the document on behalf of the FEMA. Review is conducted using the FDEM Mitigation Unit's Local Mitigation Plan Review Guide and Crosswalk, created by FDEM in March 2013 and updated in 2015. Once notified that this draft adequately addresses all requirements of the 44 CFR §201.6 (Local Mitigation Plans), the final Plan will be submitted to the participating jurisdictions' governing bodies for formal approval and adoption. Consistent with the normal practices of the participating jurisdictions, the public will have an opportunity to provide input and comments for each jurisdiction's adoption of the plan during their respective public meeting that addresses adoption in accordance with federal practice, the participating local jurisdictions have one year from the date of State approval of the plan to complete formal adoption. Resolutions of adoption are located in Appendix F.

This Plan is a dynamic document and is updated annually to ensure changing conditions are addressed for demographics, hazard characteristics, vulnerability and probability of impact or occurrences in participating jurisdictions. Disaster occurrences affecting the County will be documented. This updating process and future editions of the LMS will also be used to inform and involve the public, and other interested groups in efforts to elicit participation in making the community more resilient to the impacts of future disasters.

INTRODUCTION

St. Lucie County, the municipalities within it, districts, and public and private entities have engaged in mitigation planning since 1998 to make the population, neighborhoods, businesses and institutions of the community more resistant to the impacts of future disasters. The Steering Committee and LMS Coordinator have conducted a comprehensive and detailed evaluation of hazards and vulnerabilities that may impact the community. This is an all hazards approach from natural events to technological and societal hazards in order to identify ways to make the communities of the planning area more resilient to their impacts. This document reports the results of that planning process for the current planning period as indicated in the below table:

Table 1.0 – Planning Schedule

Start of Planning	Anticipated Completion	Date Plan Released
2/15/2016	6/1/2016	12/9/2016
7/1/2016	1/1/2017	Upon FDEM/FEMA approval

OVERVIEW

St. Lucie County is one of Florida's 67 counties. It is located on Florida's east coast in south central Florida and is bordered by 21 miles of Atlantic coastline with two inhabited barrier islands. St. Lucie County's (unincorporated) population in 2015 was estimated at 287,749, an increase of 5% from 277,789 in 2010.¹ Population is estimated to increase to 323,184 in 2020.² Respectively, the Bureau of Economic Business and Regulation reported 2015 population estimates for the City of Fort Pierce as 42,119 persons (2010; 41,590), the City of Port St. Lucie as 174,132 persons (2010; 164,603), and the Town of St. Lucie Village at 597 persons (2010; 590). Relatively small increases in population however, these are educated estimates and the 2020 US Census will shed light on more concrete populations for the County.

St. Lucie County has one ocean access inlet, Fort Pierce Inlet. The Inlet is a manmade federal inlet that is St. Lucie County's only point of access to the Atlantic Ocean--it separates the barrier islands of North and South Hutchinson Island. The inlet connects the Atlantic Ocean to the Indian River Lagoon, the St. Lucie River and tributaries (North Fork and South Fork).

HISTORICAL VULNERABILITY

In 2004, St. Lucie County was impacted by three hurricanes, Frances, Jeanne and Ivan. Personal property damage in the County from those storms was estimated at \$1 Billion with \$2.13 Million damage estimated to crop production. Since 2005, the County has experienced several natural disaster events including flooding, wildland fires, hurricanes, tropical storms, and drought, this list is bulleted below this discussion. St. Lucie County has experienced many man-made hazardous events such as major transportation accidents and hazardous materials spills, fixed facility and transportation related; cyber-attacks such as hacking and theft of private information.

¹ US Census Bureau, Quick Facts; July 1, 2014 estimate and Population Census April 1, 2010; 2020 Population Estimate.

² Bureau of Economic Business Regulation (BEBR), 2016

These types of events as well as other historic disasters led the FDEM to create the Hazard Mitigation Program and the LMS Program. The goal of the program is to encourage public and private sector entities to take actions that permanently reduce or eliminate the long-term risk to people and property from the different types of hazards faced by Florida residents.

Most recent natural disasters:

- Hurricane Sandy (non-declared) October 29, 2012 to October 30, 2012.
- Florida Tropical Storm Isaac (DR-4084), Incident Period: August 27, 2012 to August 29, 2012, FEMA Id: DR-4084, Major Disaster Declared: October 18, 2012.
- Florida Tropical Storm Fay, Incident Period: August 18, 2008 to September 12, 2008, Emergency Declared (EM-3288): August 21, 2008, FEMA Id: FEMA-EM-3288, Major Disaster (Presidential) Declared (DR-1785): August 24, 2008.
- Florida Hurricane Wilma, October 23, 2005 to November 18, 2005, Major Disaster (Presidential) Declared (DR-1609): October 24, 2005, FEMA Id: FEMA-DR 1609.
- Florida Hurricane Katrina Evacuation, August 29, 2005 to October 1, 2005, Emergency Declared (EM-3220): September 5, 2005, FEMA Id: FEMA-EM-3220.
- Florida Hurricane Jeanne, Incident Period: September 24, 2004 to November 17, 2004, Major Disaster (Presidential) Declared (DR-1561): September 26, 2004, FEMA Id: FEMA-DR-1561.
- Florida Hurricane Ivan, Incident Period: September 13, 2004 to November 17, 2004, Major Disaster (Presidential) Declared (DR-1551): September 16, 2004, FEMA Id: FEMA-DR-1551.
- Florida Hurricane Frances, September 3, 2004 to October 8, 2004, Major Disaster (Presidential) Declared (DR-1545): September 4, 2004, FEMA Id: The Department Of Public Safety -DR-1545.

Development and maintenance of this Unified LMS provides governments and non-government organizations the means to minimize impacts from future disasters, reduce recovery time lessening impacts on local economies, thereby expediting reimbursements and mitigation funding opportunities. The LMS prepares the community through preplanning and mitigation techniques, but also supports the community through outreach and education encouraging populations to conduct mitigation at the local residential level. The CRS is a program that relies on an up to date LMS. This program utilizes the NFIP and FIRM to allow residents to identify their particular location within any flood zone, but also allows for significant price reductions in the purchase of federal flood insurance.

INITIAL HAZARDS IDENTIFICATION

St. Lucie County is vulnerable to a wide range of natural and man-made hazards that threaten life and property. The US Department of Homeland Security (DHS), FEMA current regulations and guidance under the Disaster Mitigation Act of 2000 (DMA2K) require, at a minimum, an evaluation of a full range of natural hazards that include Hurricanes (wind and storm surge), floods, tornados, wildland Fire, drought, sink holes, seismic activity, and agricultural disease and pest, etc. An evaluation of technological or human-caused hazards. The initial identification of hazards for inclusion in the risk assessment was based on earlier versions of the St. Lucie County LMS, as well as a review of the State of Florida Hazard Mitigation Plan and FEMA mitigation planning guidelines and hazards identified by the LMS Steering Committee that the County is considered to be vulnerable.

This comprehensive update includes review of the State Mitigation Plan Hazards and data compiled from historical events, the National Weather Service, NOAA and FDEM.

St. Lucie County and County municipalities use an all hazards approach to mitigate disaster impacts as a measure to maintain critical services for communities. The geographic location of the County exposes populations and property to many types of natural disasters at a higher rate of occurrence than most. Hurricanes, wind and flood events, tropical storms, and tornados are the more destructive events; however, drought, agricultural disease and pests, and high heat temperatures are also destructive and can last for prolonged periods.

Man-made or technological hazards are described in depth in Section 4 of this Plan and include transportation related and cyber-attacks. Technological hazards have come to the forefront of emergency management with Cyberterrorism. Hackers have infiltrated and caused malfunctions with technology that controls major power manufacturers and can cause power outages, and loss of critical services, transportation accidents, communication failures, chemical releases, and well field contamination affecting first responders and community populations. Vulnerabilities include water and wastewater treatment facilities, railway commerce and passenger transport, Florida Power and Light's St. Lucie Nuclear Power Plant, and port activities.

St. Lucie County is a primary transportation corridor to and from central and north Florida. Interstate 95 leads north to the Kennedy Space Center, Daytona National Speedway and major sporting events and the Florida Turnpike leads travelers to central Florida to Disney World, Sea World, Epcot Center, and other attractions. State Roads 60 and 70 lead west to Busch Gardens, Tampa and St. Petersburg. South on the Turnpike and I-95 moving south leads to Palm Beach, Fort Lauderdale, Miami, common destinations for major sporting events, Spring Break, seasonal residential snowbirds, cruise ship, airline and port commerce and tourism activities. These significant roadways are critical for evacuations, commerce and populations travel. Several accidents have closed these roadways for long periods. In addition, there are several significant intersections in the County that if blocked or damaged can cause major congestion and safety issues.

The County is also susceptible to societal hazards such as terrorism, civil disturbance and immigration crises. Since the events of September 11th human societal hazards have become more widespread. Counter-terrorism planning assumptions consider smaller more rural counties can be used as "sleeper counties" referring to terrorism cells that plan, live and practice in smaller counties and travel to the intended target.

Though St. Lucie is not an obvious primary target for international terrorism, the County has several public events, a working Port and several soft targets that "home grown" domestic terrorist activities could be opportunities for attack.

Terrorism preparedness is a priority nationwide and St. Lucie County utilizes planning, exercises and training for first responders.

Each of the initially identified hazards was studied for their potential impact on St. Lucie County as well as in terms of the availability of hazard mitigation strategies to reduce that impact. Best available data on historical occurrences, the geographical location and extent as well as the probability of future occurrences have been collected and reviewed as part of the hazard identification process. The hazards St. Lucie County and municipal communities are at risk for exposure are described and fully analyzed in Section 4: Hazard Identification, Vulnerability and Risk.

INITIATING ACTION

In 1998, St. Lucie County, along with all the municipalities, the local business community, and non-profit organizations such as the Red Cross, joined together to develop a countywide Unified LMS. The St. Lucie County LMS Steering Committee, the policy body for this program, and the St. Lucie County Emergency Management Coordinator has had the responsibility for developing the LMS. This group focused on achieving two key results:

- creation of a long-term LMS planning process; and
- development of the LMS document itself along with a list of prioritized mitigation projects.

In the year 2000, FEMA's recognition of growing costs of response to and recovery from disasters materialized in the Disaster Mitigation Act of 2000 (DMA2K). DMA2K created a new Pre-Disaster Mitigation (PDM) Program aimed at reducing the cost of disasters as well as risk through comprehensive planning before disasters occur. St. Lucie County updated this LMS plan compliant with the requirements of DMA2K and on February 22, 2005 by Resolution #05-R53, and the plan was formally adopted by resolution of the St. Lucie County Board of County Commissioners. In accordance with the FEMA regulations, all hazard mitigation plans must be reviewed and updated and resubmitted to FEMA for approval every five (5) years. Updates were performed and found to be compliant with the FEMA/FDEM requirements and the plan was formally adopted by resolution of the St. Lucie County Board of County Commissioners on November 23, 2010 by Resolution #10-299. In 2016 the Plan was reviewed and comprehensively updated with intentions of submission for review and approval by the FDEM Office of Mitigation.

THE PROCESS

The process by which the LMS was completed involved:

- describing current community conditions;
- identifying potential hazards;
- assessing community vulnerability to those specific hazards;
- proposing initiatives to reduce these vulnerabilities;
- developing evaluation criteria to rank mitigation projects regardless of jurisdiction; and
- establishing updating procedures for the Plan and the PPL that are needed to promote long-term viability for the LMS Program.

FINDINGS

Key findings pertinent to St. Lucie County include the following:

- Flooding and hurricanes occur the most frequently; place the most people at risk, and produce the greatest amount of damage of all the natural hazards faced by the County.
- Wildland fires occur more frequently than flooding and hurricanes, but historically have had a lower impact on the community. Exposure to the impacts of wildland fire continues to increase as urban interface areas are developed next to wildland areas.
- Agriculture is an important component of the local economy; therefore, drought and agricultural pests and diseases can be as damaging to the agricultural community as beach erosion and flooding are to the coastal and intra-coastal communities.
- While a major focus of mitigation is retrofitting, the most effective time to mitigate is before development orders are approved. Adding hazard mitigation requirements may add to the cost of development, but this cost is relatively small. Following a disaster, the cost of recovery and redevelopment can be enormous. Recovery cost tends to become public costs that local governments must assume.
- While all jurisdictions in St. Lucie County are in NFIP, all participate in the CRS Program or the Flood Mitigation Assistance (FMA) Program to the maximum extent possible. Having a strong CRS Program reduces the cost of flood insurance premiums to St. Lucie County residents, and the FMA Program is a major source of funding to assist in retrofitting flooding problems.
- Properties on the barrier islands are susceptible to both flooding and wind-related storm damage. There are a number of important public facilities in those areas. By hardening these facilities, the chance of their being impacted by storm events can be significantly reduced.
- Transportation commercial and private on Interstate 95 and the Florida Turnpike has continually increased in volume, the probability of truck rollovers spilling of toxic contaminants and/or hazardous materials also continues to increase. The St. Lucie County Fire District hazardous materials teams have increased response training activities in efforts to become proactive in planning for releases.
- Florida East Coast Railway (FEC) and CSX Railroad traverse several densely populated areas of coastal urban population and development, putting an ever-increasing number of people at risk from train derailment and potentially significant toxic and hazardous material spills. The addition of passenger rail will present additional planning concerns for derailments.

PRIORITIZED PROJECT LIST (PPL)

The County, municipalities, and districts have already implemented numerous mitigation projects, such as:

- installation of storm shutters on public buildings; and
- retrofitted storm-water drainage systems; and
- raised finished floor elevation to 18 inches above base flood elevation; and
- distribution of informative publications on hurricanes to local residents; and
- installation of emergency generators at key critical facilities.

The objective of developing a unified, countywide PPL for mitigation projects is to allow City and County governments to better focus mitigation efforts and resources while maintaining a historical database. The existence of this list will speed local receipt of federal disaster mitigation funds after a disaster, and will place St. Lucie County in a more competitive position when competing for other, non-disaster-related mitigation grant funds.

To develop the PPL, each local government was invited to submit a list of mitigation projects for inclusion in the unified, countywide list. A project prioritization methodology was developed by the Steering Committee as a means of scoring each project, to develop a ranked list of projects. Projects are ranked according to the stakeholders' priorities. Should funding become available during the year, the Committee will review top projects to determine what projects should be submitted for funding. The St. Lucie County LMS Steering Committee last updated the PPL March 2016.

The development of this PPL is not a one-time process. To be effective, this list must be dynamic, a living document designed to track project status; completed and deleted projects as well as phased projects and will be revised as progress is made on projects and new hazards or increased vulnerabilities are identified. The PPL process will be updated and implemented as far as possible on an ongoing quarterly basis. The current PPL is located in Appendix E.

UPDATE PROCESS

Like all local comprehensive planning efforts, the LMS Plan and strategies, as well as the PPL is required to be reviewed and updated annually to ensure that it adequately addresses various types of hazards facing the community. An LMS updating process was prepared and adopted by the Steering Committee. The St. Lucie County LMS shall be updated comprehensively every 5 years in compliance with the State of Florida Division of Emergency Management and FEMA requirements. Sections of the LMS Plan shall be updated annually and noted prior to the beginning of each section with applicable updates.

SECTION 1.0 PURPOSE AND OVERVIEW

SECTION 1.0 UPDATES

- Section 1.1: Enhanced discussions of Purpose and Overview; update of composition discussion; Inclusion of Table 1.1. Status of Jurisdictions in St. Lucie County LMS; updated Benefits discussion.
- Section 1.2: enhanced and added more complete description of Planning Process, development of Quick Reference section and updated Planning Process Diagram. Replaced prior responsible agency, St. Lucie County Community Development Department (CDD) with current responsible agency, St. Lucie County Department of Public Safety/Division of Emergency of Emergency Management. Revised Steering Committee organizations list.
- Section 1.3.1: Added full description of Steering Committee.
- Subsection 1.3.1.2: Composition of Steering Committee; updated with references to LMS representation and Appendix D Stakeholder Participation, added list of Stakeholders
- Subsection 1.3.1.4: Voting process for approval on projects was updated, LMS Coordinator role added.
- Section 1.3.3: Updated process of identification of Stakeholder Groups.
- Subsection 1.3.3.1: Updated Stakeholder Roles and added LMS Coordinator duties.
- Section 1.3.6: Updated documentation responsibilities for LMS Coordinator.
- Corrected grammar and sentence structure for entire section.

1.0 PURPOSE AND OVERVIEW

1.1 PURPOSE

The purpose of the St. Lucie County LMS is to develop a unified approach in the development of strategies amongst County and municipal governments for mitigation activities and to define identified hazards and vulnerabilities in one location to promote local government and community planning to mitigate and recover from disaster impacts in St. Lucie County effectively and as efficiently as possible. This strategy will serve as a tool to direct the County and municipal, and other government entities in their ongoing efforts to reduce their vulnerabilities to impacts produced by both natural, technological, and societal hazards to which southeast Florida is exposed. This strategy also establishes priority for currently proposed mitigation projects and maintaining eligibility for funding as may be made available for disaster mitigation activities and other federal disaster assistance.

In the year 2000, the Federal Emergency Management Agency's (FEMA's) recognition of growing costs of response and recovery from disasters materialized in the Disaster Mitigation Act of 2000 (DMA2K). DMA2K created a new Pre-Disaster Mitigation (PDM) program aimed at reducing the cost of disasters as well as risk through comprehensive planning before disasters occur.

DMA2K requires that all communities, tribes, and states have a FEMA approved hazard mitigation plan consistent with the DMA2K requirements in place to retain eligibility for Pre-Disaster Mitigation (PDM) project funds and post-disaster Hazard Mitigation Grant Program funds. These grant programs are discussed more thoroughly in Section 3 of this plan.

Florida is susceptible to a number of hazards including flooding, hurricanes, tornados, wildland fire, and severe thunderstorms – these being an abbreviated list, Florida is one of the most hazard prone states in the nation. In Florida, the goals of the new PDM program are being achieved through the Local Mitigation Strategy (LMS) process. The LMS is a pre-disaster mitigation planning initiative of the Florida Division of Emergency Management (FDEM), and is intended to reduce disruption effects of natural disasters on the economic and social fabric of the community. As part of FEMA’s National Mitigation Framework, pre-disaster mitigation is defined as "sustained action that reduces or eliminates long-term risk to people and property from hazards and their effects". This definition generally distinguishes between actions that have long-term and sustainable effects from those that are more closely associated with preparedness for, immediate response to, and short-term recovery from a specific hazard event. The intent of the LMS is to focus on practices that have cumulative benefits over time and ensure that fewer of the state's citizens and communities are victims of disasters. One of the most important elements is the idea that the resulting mitigation practices are instituted prior to the disaster occurring.

Mitigation practices can be applied to strengthen homes so that people and their belongings are better protected from hurricanes, tropical storms, and inland floods promoting faster return to normalcy after a disaster. Pre-disaster mitigation planning is used to identify and protect at-risk critical facilities such as hospitals, fire and police stations, water and wastewater treatment facilities, and other essential services facilities increasing operational recovery in the wake of a disaster. Mitigation planning allows communities to consider current and future land use and vulnerabilities of developed and undeveloped land as well as the risk to people and property with existing developments. The ultimate goal is consideration of potential damage to property in vulnerable areas and implementation of actions to reduce impacts thereby eliminating disruptions that disaster occurrences create in communities. The St. Lucie County Unified LMS Hazard Mitigation program has been funded by FDEM with FEMA funds for development of comprehensive mitigation planning. The ultimate objectives of the LMS process are as follows:

- Improve the total communities’ resistance to damage from known natural, technological, and societal hazards;
- Place St. Lucie County in a position to compete more effectively for pre-and post-disaster mitigation grant funds;
- Reduce the cost of disasters at all levels; and
- Speed community recovery from disasters.

This LMS is intended to represent the following jurisdictions. A more detailed list of stakeholders and organizational representation is listed in Section 1; 1.3.1.2 - Composition and Appendix D. **Table 1.1** shows status of LMS participation by jurisdiction. Participation is defined by jurisdictional adoption (Resolutions in Appendix F), and Steering Committee membership:

- St. Lucie County
- City of Port St. Lucie
- City of Fort Pierce
- Town of St. Lucie Village

Table 1.1: Status of Jurisdictions in St. Lucie County LMS

Jurisdiction	Status
St. Lucie County	Adoption 2005, 2010
City of Port St. Lucie	Adoption 2005, 2010
City of Fort Pierce	Adoption 2005, 2010
Town of St. Lucie Village	Adoption 2010

Source: St. Lucie County Grants / Disaster Recovery, 2005, 2010 and St. Lucie County Department of Public Safety 2016

This plan will be distributed to the jurisdictions within the County for consideration of adoption. Jurisdictions have one (1) year to adopt the LMS, as this occurs, copies of the adopted resolutions will be entered into Appendix F.

Adoption of this strategy will provide the following benefits to both County and municipal governmental entities:

- Compliance with Florida Administrative Code (F.A.C.), Administrative Rules 9G-6 and 9G-7, requirements for the local Comprehensive Emergency Management Plans (CEMP) to identify problem areas and planning deficiencies relative to severe and repetitive weather hazards, and to identify pre- and post-disaster strategies for correcting and/or managing problems;
- Compliance with - FEMA's DMA2K and all updated planning guidance thus, sustaining eligibility for pre- and post-disaster State and federal funding programs such as the Pre-Disaster Mitigation (PDM) grant and the Hazard Mitigation Grant Program (HMGP);
- Credit from the National Flood Insurance Program's Community Rating System (CRS) Program for developing a Floodplain Management Program, which will help further reduce flood insurance premium rates for property owners;
- Access to FEMA's Flood Mitigation Assistance (FMA) Grant Program, which provides funding for pre-disaster mitigation projects and activities;
- Identification and prioritization of projects for funding under the State of Florida's Residential Construction Mitigation Program (RCMP) to help reduce losses under from properties subject to repetitive flooding damages; and
- Eligibility for local government public safety offices to receive funding from the Emergency Management Preparedness and Assistance (EMPA) Grant Program.

1.2 PLANNING PROCESS

The original St. Lucie County LMS was developed, approved and adopted in 1998 developed through stakeholder group engagement and community participation. The 2004 comprehensive update also utilized the stakeholders groups to build on Hazards and Vulnerability sections of the Plan and was approved and adopted. The 2010 update was completed and distributed for public comment to jurisdictional city halls, then reviewed and approved by the St. Lucie County LMS Steering Committee. The St. Lucie County Department of Public Safety, Division of Emergency Management, completed the comprehensive update of this LMS in partnership with the Treasure Coast Regional Planning Council, Emergency Management staff. The updated draft plan will be distributed to jurisdictional city halls, libraries and County Administration offices to ensure access for a public review and comment period.

It has been distributed to the St. Lucie County LMS Steering Committee for review, comment and approval.

In an effort to better define the planning process used to develop the St. Lucie County LMS, Section 6 of this document outlines the steps taken to update this plan. The following process description and diagram have been developed as a quick reference (Figure 1.1).

- The LMS Coordinator convened members of the LMS Steering Committee to oversee the LMS update process and update the PPL; and
- The St. Lucie County Division of Emergency Management conducted an educational outreach workshop for individuals, jurisdictions, community organizations, and other interested stakeholders to become involved in the LMS update process;
- The Steering Committee reviewed the PPL and updated the status of all projects. Created a historical “completed and deleted” list separate from the active 2016 PPL;
- Treasure Coast Regional Planning Council Emergency Management program director (TCRPC staff) addressed the Steering Committee to iterate the update process for the LMS plan. Currently updating **Section 2.0, Community Profile** describing the County in terms of geography, population, infrastructure, economic resources, environmental resources, historic and cultural resources, critical facilities, and property and development trends;
- TCRPC staff reviewed and evaluated **Section 3.0, Institutional Analysis**, the existing legal, regulatory, and response framework for hazard mitigation;
- The following documents were reviewed as the comprehensive updated is conducted:
 - St. Lucie County 2030 Comprehensive (Growth Management) Plan (Future Land Use, Transportation, Infrastructure, Conservation, Coastal Management, Intergovernmental Coordination, Housing, Historical and Cultural, and Capital Improvements);
 - Fort Pierce Comprehensive Growth Management Plan (Coastal Management, Conservation, Capital Improvements, Future Land Use, Housing, Infrastructure, Intergovernmental Coordination, Port, and Recreation and Open Space);
 - Port St. Lucie Comprehensive Plan (Coastal Management, Conservation, Capital Improvements, Future Land Use, Housing, Infrastructure, Intergovernmental Coordination, Port, and Recreation and Open Space);
 - St. Lucie County Land Development Code;
 - St. Lucie County CEMP;
 - St. Lucie County CRS current jurisdictional ratings;
 - St. Lucie County Continuity of Operations Plan (COOP);
 - 2010 LMS Prioritized Project List;
 - Review of the following appendices:
 - Acronyms and Definitions (Appendix A);
 - Critical Facilities and Hazards List (Appendix B);
 - Forms (Appendix C);
 - Stakeholder Participation (Appendix D);
 - Prioritized Project List (PPL) (Appendix E); Added this Appendix
 - Adoption Resolutions (Appendix F) ; and
 - References (Appendix G); Added this Appendix

Figure 1.1 – Local Mitigation Strategy (LMS) Planning Process



1.3 PUBLIC PARTICIPATION PROCESS

St. Lucie County seeks to involve a diverse group of individuals and organizations in planning mitigation activities within the County for natural, technological, and societal hazards. This LMS intends to maintain a broad decision-making body (Steering Committee) to develop mitigation projects and update the Plan continuously. The St. Lucie County LMS employs multiple methods of involving the jurisdictions, organizations, businesses, and citizens of St. Lucie County to ensure that full participation in the decision making process. The Steering Committee strongly encourages public participation in the review and comment periods when updates to the Plan are released, but also by invitation to Steering Committee quarterly meetings. The LMS Coordinator will also aid in education and outreach to the public by information dissemination through the County calendar and website that will house the LMS and an electronic form for submission of public comment which will be monitored by the LMS Coordinator and all comments received will be delivered to the Steering Committee. The Committee seeks to enhance and expand opportunities for public involvement. The graphic below illustrates how the Committee will expand participation. The Committee envisions a three-tiered participation process. Descriptions of each level of participation are discussed below.

1.3.1 Steering Committee

A representative Steering Committee oversees the St. Lucie County LMS process. The Committee is comprised of County and municipal agency and/or department heads or their designee. An alternate for each primary member is encouraged to be appointed so that any item requiring a vote, there is assurance the jurisdiction is represented.

1.3.1.1 Role of Committee

The Committee serves as the policy development body for the LMS program. The role of the Committee is to advise and assist in the formulation, implementation, administration, and refinement of the Unified St. Lucie County LMS which includes the Plan and the PPL. The Committee shall represent the diverse interests found in St. Lucie County.

Figure 1.2 – LMS Participation Groups



1.3.1.2 Composition

Individuals serving on the LMS Steering Committee shall represent the following broad stakeholder groups. The Committee is broad to more equitably represent the stakeholder groups present in St. Lucie County. Occasionally a seat will become vacant. In this case the LMS Coordinator shall coordinate with the organization to invite representation. Appendix D – Stakeholder Participation includes the list of current Steering Committee members and Stakeholder Groups.

- City of Fort Pierce
- City of Port St. Lucie
- City of Port St. Lucie Utilities Systems
- Fort Pierce Farms Water Control District
- Fort Pierce Utilities Authority
- Fort Pierce Housing Authority
- Florida Department of Health at St. Lucie County
- Florida Power and Light (FP&L)
- Florida Forest Service
- Indian River State College
- North St. Lucie County Water Control District
- Red Cross
- SAFER, St. Lucie County
- South Florida Water Management District
- St. Lucie County
 - Chamber of Commerce
 - Council on Aging
 - Agricultural/Environmental Extension Service
 - Fire District
 - Public Safety
 - School District
 - Sheriff's Office
 - Transportation Planning Organization (TPO)
 - Utilities
- St. Lucie West Services District
- Town of St. Lucie Village
- Treasure Coast Regional Planning Council
- Any organization that represents the citizens of St. Lucie County

One representative and one alternate will represent the stakeholder groups above. The representative membership will be re-affirmed annually during a designated Steering Committee meeting through a self- selection/voluntary basis. The annual re-affirmation of the membership will be submitted to the FDEM with the January annual LMS report.

1.3.1.3 Steering Committee Responsibilities

The Steering Committee shall have the following responsibilities:

- designation of a Chairperson and Vice-Chairperson;
- ongoing review of the plan to ensure that it always meets the goals and ensures mitigation actions meet the overall strategy
- coordinate all mitigation activities within the County;
- submit new projects and update status of current projects; and
- prioritize local mitigation projects; and
- submit annual LMS updates to the FDEM by the last working weekday of each January. Updates shall utilize the FDEM Crosswalk to ensure at a minimum:
 - Changes to the hazards assessment;
 - Changes to the PPL;
 - Changes to critical facilities;
 - Changes to the repetitive loss list; and revisions to any maps.

The Committee, as noted above will review and provide comments on all draft sections of the LMS. A formal voting process will take place for approval of draft and final sections of the LMS as well as the PPL.

1.3.1.4 Voting

The voting and approval process for the Steering Committee shall be as follows:

Each organization represented on the Steering Committee and listed in Section 1.3.1.2 shall receive one vote. A simple majority rules procedure shall be followed when a vote is required. If an organization's representative is not able to attend a meeting, another representative of the organization can assume the voting responsibilities of the designated representative. One representative and one alternate from a stakeholder agency, department or group may serve on the LMS Steering Committee. One Committee Chair and one Vice- Chair are selected by the Committee. The LMS Coordinator will organize Committee meetings and will prepare annual progress reports to the elected bodies of the participating jurisdictions. The Chair and the Vice-Chair will not have regular voting authority, but will have tie-breaking voting authority when such occasions arise

1.3.1.5 Participation Requirement

Participating municipalities, agencies, and districts Steering Committee members are required to attend Steering Committee meetings, provide input and technical information to the planning process (if available), and disseminate information to others within the represented sector.

1.3.2 Subcommittees

The Steering Committee Chair is authorized to establish ad-hoc subcommittees as needed to further the goals and objectives of the LMS. These subcommittees can be formed to address special issues and can be disbanded once an issue has been properly addressed. Subcommittee members need not be Steering Committee members, but may be any individual able to provide special expertise and knowledge about specific concerns addressed in the LMS.

Community Stakeholder Groups

Community stakeholder groups are any community group or organization with an interest in reducing the risks posed by natural hazards in St. Lucie County. The LMS Steering Committee, by reviewing 17 Emergency Support Functions and identifying agencies associated with each function, identified key community stakeholder groups and invited each to attend LMS Steering Committee meetings. The LMS Coordinator also made a presentation regarding the LMS to the Property Homeowners Association Committee, a committee comprised of the directors of homeowner associations throughout the County. An invitation to attend LMS Steering Committee meetings was extended at the Homeowners Association Committee meeting. In an effort to develop a mitigation planning process that is community based and focused on creating disaster-resistant communities in St. Lucie County, community stakeholder groups are invited to participate. All meetings of the LMS Steering Committee are publically noticed.

Community stakeholder groups are any community group or organization with an interest in reducing the risks posed by natural hazards in St. Lucie County.

1.3.2.1 Role of Community Stakeholder Groups

In an effort to develop a mitigation planning process that is community based and focused on creating disaster resistant and more resilient communities in St. Lucie County, community stakeholder groups are invited to participate. Stakeholders provide the process with valuable information about past, present, and future conditions within the community. Stakeholders are asked to participate in an effort to capture input that is representative of the diverse needs of citizens, businesses, and organizations in St. Lucie County. Stakeholders are invited to participate in the LMS process via notices and correspondence, The LMS Coordinator will develop notifications by way of press releases to all media outlets, place on county web site and through social media, to the membership, Notice on the St. Lucie County website calendar, and invitations to Steering Committee membership and Stakeholder groups via email and occasionally hard copy letters to attend quarterly and/or specially called meetings.

1.3.3.2 Composition

Participating stakeholder groups involved in the LMS process include historic museums, disaster services, faith based organizations, and local hospitals. A complete list of participating community stakeholder groups and their participation can be found in Appendix D. The sector representatives are described in Section 1.3.1.2.

1.3.3.3 Responsibilities

Participation for community stakeholder groups is highly encouraged and voluntary. Groups can participate in the LMS process in the following ways:

- Attend Steering Committee meetings; and/or
- Serve as a Steering Committee representative for their stakeholder group or sector; and/or
- Provide input and technical information to the planning process; and/or
- Review and comment on draft final sections of the LMS; and/or disseminate information to others within the stakeholder's organization.

1.3.4 Citizen Participation

1.3.4.1 Role of the Citizen

In an effort to develop mitigation planning processes that are community based and focused on creating disaster resistant communities in St. Lucie County, citizens are invited to participate in Steering Committee meetings and LMS Workshop (educational series conducted quarterly). Citizens provide the process with valuable information about past, present, and future conditions within the community. Citizens are asked to participate to capture input representative of the diverse needs of citizens, businesses, and organizations in St. Lucie County. Citizens will be made aware of the opportunity to participate in the LMS process via the Community Calendar on the County website, media outlet postings and press releases, newspaper notices and through social media.

1.3.4.2 Participation Responsibilities

Citizen participation is highly encouraged and voluntary. Individuals can participate in the LMS process in the following manners:

- Review and comment on draft and final plans via County website, municipal city halls, County Administration or library branches; and/or
- Attend noticed public meetings.

1.3.5 New Jurisdictions/Entities

In the event of restructuring that duly adds, deletes, or merges jurisdictions within the County, the LMS will appropriately adjust its voting member rolls and other pertinent data in reference to the altered jurisdiction(s).

1.3.6 Documentation

Following each meeting, a summary will be prepared detailing how solicitation was completed for that specific meeting along with any comments and suggestions made by the public and/or community stakeholder groups. As per local, State and federal records retention requirements, for each meeting, the LMS Coordinator will maintain copies of meeting summaries, attendance rosters, public invitations, public comments and input, and all other documents associated with Steering Committee meetings and Workshops at the St. Lucie County Division of Emergency Management. Public comments will be located in Appendix D.

In order to invite and promote the opportunity for broad participation, meeting notices and agendas are posted through some combination of the following: newspaper ads or public service announcements, postings on County and municipal websites, announcements on the County's TV station (Channel 20), postings in County and municipal newsletters and calendars, and faxes and e-mailings to previous participants. The procedures of invitation will be documented, along with comments in the meeting summaries located in Appendix D. The various invitation notices are to ensure the continuation of public participation in the LMS update process and other activities in the future.

SECTION 2.0

COMMUNITY PROFILE

SECTION 2.0 UPDATES

- Section 2.0: (Community Profile) – Population, future land use, economic and housing data all updated to use of 2010 and 2014 data. References updated where appropriate.
- Section 2.1: Added new substantial geography data for County and associated jurisdictions; added average weather conditions for County;
- Section 2.2: Updated population projections and demographic information;
- Section 2.2: Added substantial discussion on Employment; added
- Table 2.2: Added Table 2.2 -Employment by Industry, percentages of employed to illustrate County characteristics.
- Figures 2.1 and 2.2; Updated and reformatted figure attributes.
- Section 2.3: Updated with more recent data regarding added/removed infrastructure;
- Section 2.4: Updated and rewrote section opening, added Table 2.3 to more accurately describe the associated jurisdictions and the most recent development trends;
- Section 2.6: Updated with new data regarding additional environmental resources that have been acquired in recent years;
- Section 2.7: Updated with new data regarding additional historic and cultural resources;
- Section 2.8: Entirely rewrote critical facilities within St. Lucie County;
- Included updated Urban Service Area and Future Land Use Maps; and
- Included a new Critical Facilities Map.

2.0 COMMUNITY PROFILE

This section describes the geography, population, infrastructure, property/development trends, economic resources, environmental resources, historic/cultural resources, and critical facilities within St. Lucie County (unincorporated) and municipalities of the City of Fort Pierce, the City of Port St. Lucie, and the Town of St. Lucie Village.

2.1 GEOGRAPHY

St. Lucie County is located on the Atlantic along the south central coast of Florida in the upper reaches of the South Florida geographic region. It is nearly rectangular in shape. At its widest points, the County measures 24 miles, north/south and 29 miles east/west. The County occupies a total of 572 square miles (358,460 acres) of which approximately 60 square miles (38,400 acres) are water and 515 square miles (330,020 acres) are land. The County comprises approximately 572 square miles, 480 square miles of which are unincorporated, the balance of the land area is located within the three (3) incorporated municipalities; Fort Pierce (14.7 square miles), Port St. Lucie (120 square miles), and St. Lucie Village (approximately 1 square mile).

Physiographically, the County is divided into three primary regions, the Atlantic Coastal Ridge (including the barrier islands), the Eastern Valley and Osceola Plain. The mainland topography of St. Lucie County is generally low in elevation, without significant deviation. However, two ridges parallel the coast, one about 1 mile inland from the Indian River with elevations up to 30 feet, the other about 10 miles inland with similar elevations. The coastal barrier islands have typical dune topography with dune elevations of about 15 feet.

St. Lucie County may be characterized as slightly rectangular in shape. At its widest points, the County measures 24 miles north/south and 29 miles east/west. The mainland topography of St. Lucie County is generally low in elevation, without significant deviation. Two ridges parallel the coast, the Atlantic Coastal Ridge (including the barrier islands) about 1 mile inland from the Indian River with elevations up to 30 feet, the other about 10 miles inland with similar elevations. The coastal barrier islands have typical dune topography with dune elevations of about 15 feet.

The County is divided into three physiographic regions, the Atlantic Coastal Ridge (including the barrier islands), the Eastern Valley, and the Osceola Plain. The most populated area of the County is the Eastern Valley. The Valley extends from the Atlantic Coastal Ridge to the central part of the County. As noted above, the elevations for the entire County range from +15 to +30 feet above sea level.

The vast citrus and ranching areas of central and western St. Lucie County are contained within the areas known as the Sebastian/St. Lucie Flats, Allapattah Flats and Osceola Flats (the Osceola Plain). Except where drained for agricultural activities, these areas are characteristically pocketed with surface wetlands and have limited natural drainage. Elevations in this area are in the range of +30 to +60 feet above sea level, with the general fall of the land being from northwest to the southeast. Drainage of this area is provided by the North Fork of the St. Lucie River and a network of manmade canals and ditches that are interconnected with main relief canals that drain into the Indian River Lagoon and the North Fork of the St. Lucie River.

The Atlantic Coastal Ridge forms the eastern border of the County and includes the coastal barrier islands North and South Hutchinson Island. Elevations range from sea level to about +15/+17 feet on the barrier island to as much as +60 feet along the western shorelines of the Indian River Lagoon. The western terminus of the Atlantic Coastal Ridge lies along the shoreline of the Indian River Lagoon south of Fort Pierce and along the U.S. Highway 1 right-of-way (eastern side) north of Fort Pierce.

The North Fork of the St. Lucie River is the single principal freshwater estuary in St. Lucie County. Secondary watercourses include the North Fork's two primary tributaries; Five Mile and Ten Mile Creeks. An unconnected freshwater marsh network, known as the Savannas, is located immediately to the west of the Atlantic Coastal Ridge. The Savannas represent a vanishing natural feature that was once found along the entire length of the Indian River Lagoon, from Volusia County to northern Palm Beach County. The key tracts of habitat that remain are situated in Port St. Lucie and northern St. Lucie County. Through the continued effort of the State of Florida's Florida Forever Program, privately held properties within this area are being acquired for perpetual public preservation.

Lying between the western edges of the Atlantic Coastal Ridge and Hutchinson Island is Indian River Lagoon. This saltwater estuary is part of a larger ecosystem that extends 115 miles from Volusia County to northern Palm Beach County.

In addition to its inland estuary and isolated wetland network, St. Lucie County has 18 miles of Atlantic Ocean shoreline. Through the efforts of the citizens of St. Lucie County and the State of Florida, approximately 4.5 miles of this unincorporated oceanfront are under public ownership. Another 2 miles of oceanfront property are owned by the Florida Power & Light Company (FP&L), and are to be maintained in their present natural state in conjunction with the operation of the St. Lucie Power Plant facilities. The balance of the remaining oceanfront properties is held in private ownership and available for development activities, which have historically been residential in character. Presently, approximately 75% of this privately held frontage is developed for residential or business purposes.

St. Lucie County is considered a sub-tropical climate and experiences approximately 80 thunderstorm days a year. Annually the County averages 132 days of measurable precipitation, 74 clear days, 150 partly cloudy days and 132 cloudy days. Annual rainfall is approximately 57 inches. Ninety percent of the time, the prevailing wind direction is from the east – the Atlantic Ocean. This keeps the immediate coastal area cool in summer and warm in winter.

From a hazard perspective, especially in terms of flooding, drainage has been an important component in shaping overall development patterns within the County. Many canals and drainage ditches have been constructed throughout St. Lucie County. The primary canals include:

- **C-23:** Provides drainage for 168 square miles in southern St. Lucie, northern Martin, and eastern Okeechobee counties. C-23 and its structures remove excess water from the C-23 Basin, supply water to the basin (and, occasionally, to the C-24 Basin), and maintain ground water elevations west of S-48 to prevent saltwater intrusion into the local ground water.
- **C-24:** Provides drainage to 167 square miles in central St. Lucie and east central Okeechobee counties. C-24 and its control structures remove excess water from the C- 24 Basin, supply water to the basin, and maintain ground water table elevation west of S-49 adequate to prevent saltwater intrusion into the local ground water.
- **C-25:** Provides drainage to 165 square miles in northwest St. Lucie and eastern Okeechobee counties. C-25 control structures remove excess water from the C- 25 Basin, supply water to the basin (and occasionally, to the C-24 Basin), and maintain ground water table elevation west of S-50 adequate to prevent saltwater intrusion into the local ground water.
- High risk areas relative to flood, hurricane and nuclear power plant emergencies have been identified and designated based on elevation, proximity to the coast and the nuclear power plant. Populations at risk for these threats are notated in the table below.³

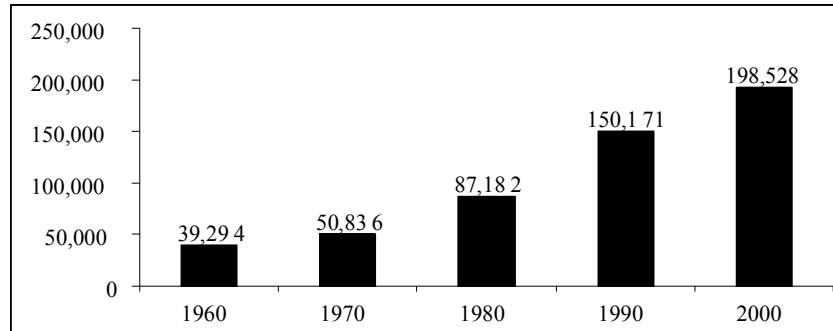
2.2 POPULATION

In the year 2000, St. Lucie County's population was estimated to be 126,731. The County population grew by 25.6% between 1990 and 2000. The Treasure Coast has experienced tremendous growth since the 1960's, and this trend is expected to continue.

³ For Hurricane Storm Surge Areas and Mobile Home Surge Population data and Residential Units taken from Census 2010; and 2015 Update Statewide Treasure Coast Regional Evacuation Study,

Figure 2.1 illustrates population growth in St. Lucie County between 1960 and 2000.

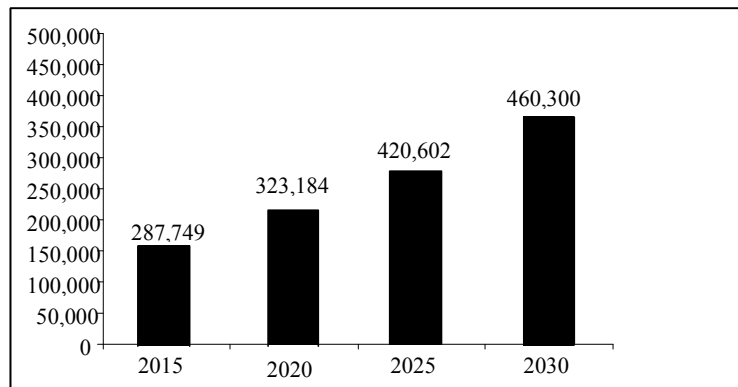
Figure 2.1. Population Growth, St. Lucie County, 1960 – 2000.



Source: United States Census, 2000

The majority of the growth has occurred and is expected to continue to occur in proximity to the City of Port St. Lucie, the fastest growing area in St. Lucie County. **Figure 2.2** illustrates the projected population between 2015 and 2030.

Figure 2.2: Projected Population, St. Lucie County, 2015 – 2030



Source: Bureau of Economic Business and Regulation (BEBR), 2015

In 2015, St. Lucie County was ranked 27th in the State with population estimated at 287,749, somewhat slowed growth of 5,032 people from 277,789 in 2010.⁴ Population is estimated to increase to 323,124 in 2020.⁵ Respectively, the Bureau of Economic Business and Regulation (BEBR) reported 2015 population estimates for the City of Fort Pierce as 42,119 (2010; 41,590), the City of Port St. Lucie as 174,132 persons (2010; 164,603), the Town of St. Lucie Village at 597 persons (2010; 590). **Table 2.1** illustrates municipal population growth from 2000 to 2015 with projections for the year 2020. The population estimate for 2020, reported by BEBR, indicates a greater than 12% expected increase countywide with the median age dropping from 43.3 to 41.3 years old.

⁴ US Census Bureau, Quick Facts; July 1, 2014 estimate and Population Census April 1, 2010; 2020 Population Estimate.

⁵ Office of Office of Economic and Demographic Research, Florida Legislature: December, 2015

Table 2.1: Population, St. Lucie County

Municipality	Population			
	2000	2010	2015	2020
Fort Pierce	37,516	41,590	42,119	N/A
Port St. Lucie	88,769	164,603	174,132	N/A
Unincorporated (County)	71,596	71,006	70,901	N/A
St. Lucie Village	647	590	597	N/A
TOTAL	198,528	277,789	287,729	330,466

Source: Bureau of Economic Business and Regulation, April 1, 2015

Other significant population characteristics include age, race, income, and special needs. The median age of St. Lucie County residents is 43.3. Twenty percent of the County is over the age of 65. This is significant because elderly populations may require additional or special assistance during a hazard event. Because cultural differences can influence an individual's response to an event, it is important to define the County population in terms of ethnicity. 16.6% of St. Lucie County's residents are Hispanic or Latino, while 19.1% are Black or African American. The entire population countywide grew 3.6% between 2010 and 2015.

Languages

Nearly 20.3% of residents speak a language other than English at home, a 6% increase from the 2010 census data of 14%. Language is an important consideration when developing preparedness materials and communicating evacuation and safety information for residents.

Income

The median household income in St. Lucie County is \$42,665 with per capita income at \$34,129 in 2014, much below the State of Florida average of \$42,737. 17.3% of for all ages reported are considered to live below the poverty level. Per capita personal income of the entire county is approximately 20% lower than the State average.

Employment

County and municipal community population's employment figures have changed little since 1990, however decreased from 62.9% to 58.6% in the year 2000. Though numbers of employed fluctuated heavily during the recession (2007-2010), employment reported in 2014 shows 58.5%, 4% below the State of Florida average employment of 62.5%.⁶

Employment warrants expanded discussion in that the sectors that employ significant populations within the communities of the County, and if impacted by an incident or disaster, the economy will be severely crippled – mitigation and recovery are paramount to the economic health of the County as a whole. **Table 2.2** below shows that the highest percentage of employment occurs in the Trades, Transportation & Utilities (22.3%) and Government (18%) sectors, with Education and Health Services ranked 3rd with 16% employment. Importantly, ranked 4th and 5th are Leisure & Hospitality and Professional and Business Services. The County and region in general rely and are somewhat dependent on tourism, marine recreation, major and minor league baseball training and Spring Break for students.

⁶ Florida Legislature; Office of Economic and Demographic Research; December, 2015

In addition, the County is a thoroughfare for major commerce and transport of goods and soon to be passenger rail, a working port, an international airport, and major highways that link south Florida to the rest of the State. Finally, the County has a high percentage of persons employed by local governments and health services.

As noted in **Table 2.2**, the County's highest employment sectors are sectors that would be essential to recovery for the community. Health services in particular are significant and critical to the populations for services and safety. Resiliency in the wake of a significant incident or disaster could be Efficient, fast recovery from disasters whether catastrophic from hurricanes, tropical storms, tornados or other natural disasters, or from man-made or technological emergencies or incidents, such as disruption of services (electrical, internet, etc.) via terrorism incidents, cyberterrorism or accidents),

Table 2.2: Employment by Industry

Industry	% Employed (St. Lucie)	% Employed (Florida)
Trades, Transportation & Utilities	22.3%	20.9%
Government	18.0%	13.2%
Education & Health Services	16.5%	14.8%
Leisure & Hospitality	11.8	14.0%
Professional & Business Services	11.2%	15%
Construction	5.5%	5.1%
Manufacturing	4.2%	4.3%
Other Services	3.8%	3.2%
Financial	3.6%	6.6%
Natural Resources & Mining	2.4%	1.1%
Information	0.8%	1.8%

Source: Office of Economic and Demographic Research

2.3 INFRASTRUCTURE

2.3.1 Public Buildings

There are 51 schools, 17 Elementary Schools, 4 middle schools, 6 high schools and 12 K-8 schools. There are 2 Non-traditional (digital and online), 4 Magnet Schools and 5 Charter schools and one 6th grade through 12th grade school. The program sites include Applied Technology; Challenger, which services physically, mentally, and emotionally handicapped, as well as gifted and English as second language students; the Environmental Studies Center, which provides hand-on education; Gertrude Walden, which provides childcare services; and Spectrum, an alternative high school. The school system is operated by the St. Lucie County School District. Appendix B provides the list of county and municipal facilities and their associate hazards.

2.3.2 Transportation

The County is served by two major transportation corridors, (e.g., Interstate 95, Florida Turnpike) two railway lines, (e.g., Florida East Coast [FEC], CSX), and U.S. Highway 1, the main north-south route serving the coastal areas. There are also 12 State Roads in St. Lucie County, SR A1A, 5, 9, 68, 70, 91, 607, 608, 614, 615, 713 and 716.

The FEC Railroad right-of-way runs along the coast, within proximity to two key St. Lucie County population centers, St. Lucie Village and the City of Fort Pierce. CSX rail does not actively run rail through the County, the majority of rail runs in Palm Beach County; however rail cars are frequently transported with FEC railway.

In 2017, passenger rail transportation will be instituted through the County on the same tracks as FEC commercial rail is run via All Aboard Florida. Number of cars, trains and passengers is not yet finalized and this information will be updated as it is received. Under the Hazards Section of this LMS vulnerability will be updated for hazardous materials releases, train derailment and passenger risks.

2.3.3 Utilities

FP&L and Fort Pierce Utilities Authority (FPUA) provide electric service in the County. FP&L operates its nuclear power plant at 6501 S Ocean Drive, Jensen Beach. FPUA's gas fired plant is located 2191 South Jenkins Road, Fort Pierce. TECO/People's Gas, Amerigas, Ferrell Gas, and FPUA provide natural gas within the County. AT&T is the sole telephone provider for the County. Water and sewer are provided by numerous organizations including FPUA, St. Lucie County Utilities and Port St. Lucie Utilities

2.4 PROPERTY AND DEVELOPMENT

St. Lucie County, located along Florida's southeast coast comprises 571.93 square miles, of which approximately 440 square miles represent the total land area of the unincorporated County. The balance of the County consists of land area within the incorporated municipalities of Fort Pierce, Port St. Lucie and St. Lucie Village. The County is bounded on the north by Indian River County, on the east by the Atlantic Ocean, on the south by Martin County, and on the west by Okeechobee County. The important aspects of the County's Future Land Use Element that have influenced growth include designation of the urban service boundary, and emphasis on single family residential development and economic development.

As growth has occurred, the County has become more urbanized, especially east of the Interstate 95 corridor. Land in St. Lucie County is used for three major purposes: urban uses, agriculture, and protecting environmentally sensitive resource areas (e.g., water conservation areas, Savannas State Reserve Area, beach areas). There has been some conversion of rural, agricultural areas into residential communities and industrial and business employment centers. However, the major change has occurred in Port St. Lucie. The City is the result of a massive land sale project created by General Development Corporation (GDC) during the 1960's. However, it was not until the late 1970's that development began to dramatically increase. According to Enterprise Florida (2013), there are 9,809 acres of land zoned industrial in the County, with 1,300 acres designated as industrial parks.

Primary land uses of the densely populated east coast are light manufacturing, selected service trades, construction, real estate, wholesale, and retail trade. According to the 2010 U.S. Census, there are approximately 485.7 people per square mile in the County. West of the Florida Turnpike, land uses are predominantly agriculture and woodland with random areas of development. These areas of woodland and agriculture create a high risk for large-scale wildland fire. There are a total of 5,062 establishments zoned for commercial or industrial use.⁷

In 2000, St. Lucie County had a total of 91,254 Single-family Residential housing units (76,933: Occupied), the 2010 Census confirmed 137,029 units (108,523: Occupied), and 2014 statistics show 137,339 housing units countywide - comprised mostly of single-family detached units. The average household size of 2.53. Seventy-five percent of homes in St. Lucie County were built prior to 1990. The US Census reported that 73.3% of residents own their own home in St. Lucie County, and the median value of owner-occupied homes in the County is \$120,700 with waterfront parcels within the County at a premium. In 2014, 962 housing units were permitted. In 2015, the St. Lucie County Property Appraiser release Taxable Property Values, reporting that the overall taxable value in the County will jump 4% to 16.2 billion, with the City of Port St. Lucie seeing an increase of 6.5% (7.2 billion), Fort Pierce increase of 2.5 (1.9 billion) and the Town of St. Lucie Village will see its overall taxable value increase by 2% (56.9 million). The 2015 taxable assessments reflect the values of the prior year (2014). Below, **Table 2.3** below displays the current (2015) total parcels and breakdown.

Table 2.3: Parcel Breakdown - St. Lucie County

Parcel Type	Total
Single Family Residential	96,361
Condominiums	14,627
Multi-Family Less than 10 Units	1,495
Multi-Family 10 Units or More	70
Mobile Homes	4,704
Vacant Residential	31,457
Cooperatives	2
Retirement Homes/Misc Residences	976
Improved Commercial	2,489
Vacant Commercial	1,482
Improved Industrial	1,181
Vacant Industrial	416
Agricultural	2,507
Institutional	607
Government	3,864
Leasehold Interests	21
Miscellaneous	2,646
Non-Agricultural Acreage	1,466
Total	

⁷ Enterprise Florida, 2013

Table 2.4: Community Characteristics - St. Lucie County.

City	Location	Urban/Rural	Community Character (Residential/Working/ Retirement)	Economic Base (Industrial/Agricultural/ Retirement/Business)
St. Lucie Village	Coastal	Semi-Urban	Residential/Retirement	Residential/Retirement
Fort Pierce	Coastal	Urban	Residential/Working	Residential/Industrial/ Business
Port St. Lucie	Inland	Urban	Residential/Working/ Retirement	Residential/Business
Unincorporated St. Lucie County	Coastal/Island	Urban/Rural	Residential/Working/ Retirement	Industrial/Agricultural/ Business

Source: St. Lucie County Grants / Disaster Recovery

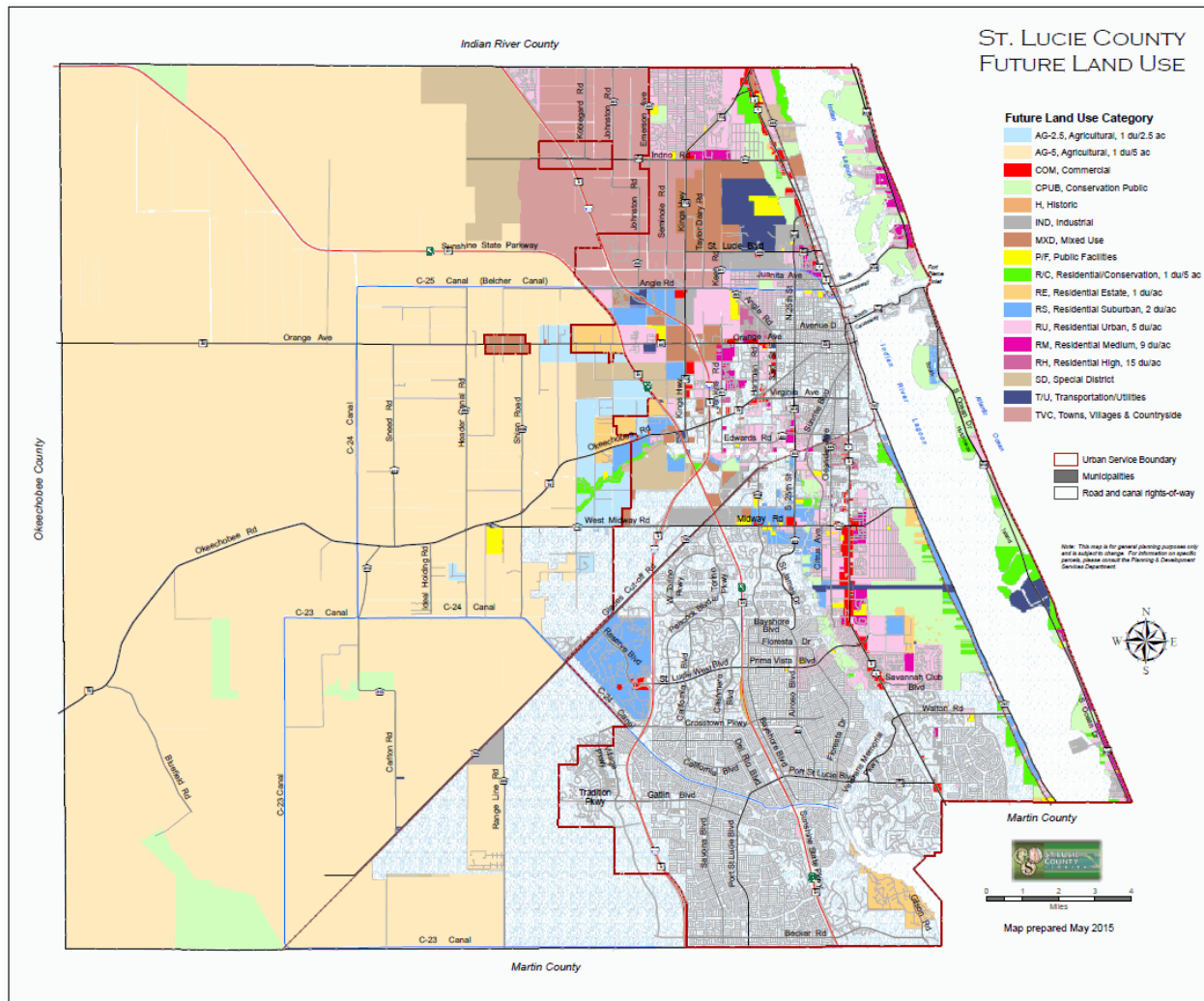
In 2013, St. Lucie County completed an inventory of vacant residential land outside the urban service districts in the County. **Table 2.5** displays the total number of parcels and acres of vacant residential land categorized by their Future Land Use designations.

Table 2.5: Future Land Use - St. Lucie County

Future Land Use	Acreage	% of Total Land Area
Agricultural-5	187,013.20	65.80%
Agricultural 2.5	3,633.04	1.28%
Residential Estate	2,809.39	0.99%
Residential Suburban	6,385.66	2.25%
Residential Urban	14,114.35	4.97%
Residential Medium	1,807.88	0.64%
Residential High	449.02	0.16%
Residential/Conservation	2,646.85	0.93%
Conservation-Public	11,985.24	4.22%
Commercial	1,702.64	0.60%
Industrial	2,741.25	0.96%
Public Facilities	1,412.35	0.50%
Transportation Utilities	2,930.00	1.03%
Mixed Use Development	5,219.67	1.84%
Historic	8.30	0.00%
Special District	8,038.02	2.83%
Towns, Villages & Countrysides	13,570.61	4.77%
Right of Way	6,954.26	2.45%
ROW/Water(Non-parceled Areas)	10,769.32	3.79%
Spoil Islands and Submerged Lands	31.31	0.01%
Total	284,223.36	100.0%

Source: St. Lucie County Comprehensive Growth Management Plan – Future Land Use Element

Figure 2.3: Future Land Use Map - St. Lucie County



Source: St. Lucie County Planning and Growth Management, Future Land Use Element 2015

Below, **Table 2.6** illustrates vacant lands with future land use acreage and the percentage of total area available in the County to accommodate future population. This information is important given the expected growth in St. Lucie County. Planning for where development should occur is an important step in reducing the risks posed by natural, technological, and societal hazards.

Table 2.6: Vacant Lands with Future Land Use - St. Lucie County

Vacant Land with Future Land Use	Acreage	% of Total Area
Agricultural-5	471.98	6.75%
Agricultural 2.5	142.87	2.04%
Residential Estate	81.39	1.16%
Residential Suburban	889.13	12.72%
Residential Urban	2,674.21	38.26%
Residential Medium	684.07	9.79%
Residential High	123.37	1.77%
Residential/Conservation	584.71	8.37%
Conservation-Public	50.12	0.72%
Commercial	677.40	9.69%
Industrial	26.37	0.38%
Public Facilities	35.43	.051%
Transportation Utilities	10.60	0.15%
Mixed Use Development	132.21	1.89%
Special District	177.12	2.53%
Towns, Villages & Countrysides	218.88	3.13%
Right of Way	7.21	0.10%
Spoil Islands and Submerged Lands	2.12	0.03%
Total	6,989.19	100.0%

Source: St. Lucie County Planning and Growth Management, Future Land Use Element 2009

2.5 ECONOMIC RESOURCES

The Chambers of Commerce serves businesses in St. Lucie County from a central location in St. Lucie West. In 2000, the top three industries in St. Lucie County were education, health, and social services; retail trade; and construction. In 2008, the top three industries were retail trade, healthcare and social assistance, and education services. In 2014, BEBR, as the excerpt below from Table 2.2 above indicates that Trades, Transportation and Utilities, Government and Education & Health Services are now the top three with Leisure & Hospitality and Professional & Business Services nearly tied for the 4th position. For comparison purposes, the column to the far right shows the State of Florida percentage employed.

Employment Sector	St. Lucie % Employed	Florida % Employed
Trades, Transportation & Utilities	22.3%	20.9%
Government	18.0%	13.2%
Education & Health Services	16.5%	14.8%
Leisure & Hospitality	11.8	14.0%
Professional & Business Services	11.2%	15%

There is one Foreign Trade Zone in the County. A Foreign-Trade Zone is a specially designated area, in or adjacent to a U.S. Customs Port of Entry, that is considered to be outside the Customs Territory of the U.S. The following is a partial list of the many benefits that can be attained from using Foreign Trade Zones or Foreign Trade Subzones:

- No duty is paid on re-exported merchandise from a Foreign Trade Zone.
- If the merchandise is sold domestically, no duty is paid until it leaves the zone or zones.
- Generally, no duty is paid on waste or yield loss in a Foreign Trade Zone or Subzone.
- Duty on scrap is eliminated or reduced in a Foreign Trade Zone.
- Generally, if foreign merchandise is manufactured within a Foreign Trade Zone, into a product with a lower duty rate, then the lower duty rate applies on the foreign content when duty is paid.
- Merchandise in a Foreign Trade Zone may be stored, repackaged, manipulated, manufactured, destroyed, or otherwise altered or changed.

The Intracoastal Waterway

The Atlantic Intracoastal Waterway (AICW) is a 1,391-mile channel between Trenton, New Jersey, and Miami, Florida. The Waterway along Florida's eastern seaboard is 406 miles long and follows coastal rivers and lagoons past numerous tourism-oriented communities. The channel is authorized to a depth of 12 feet from Nassau County to Fort Pierce, and a 10 foot depth south through Miami-Dade County. Boating activities on the waterways contribute to the existence of numerous marine-related businesses such as marinas and boatyards and have stimulated development of residential properties on the Waterways.

2.6 ENVIRONMENTAL RESOURCES

St. Lucie County maintains approximately 38 parks totaling 1,450 acres, 19 beach access areas, 14 boat launches, 12 beach-front parks, 22 landscaped government sites, 23 baseball fields, 3 stadiums, and several community centers. There are three State Parks located in St. Lucie County: Fort Pierce Inlet State Park, Avalon State Park, and Savannas Preserve State Park. The Fort Pierce Inlet State Park consists of 340 acres of land located on the southern tip of North Hutchinson Island including wide sandy beaches and 1,500 feet of frontage on the Fort Pierce Inlet. Avalon State Park has more than a mile of undeveloped beachfront. The Savannas Preserve State Park is the last remaining freshwater marsh with multi-use trails and wildlife viewing.

To date, St. Lucie County has acquired approximately 11,000 acres under the Environmentally Significant Lands Program.⁸ The purpose of the program is to purchase land with the intent of preserving ecologically unique communities, to protect and restore ecosystems to their natural state both upland and wetland to preserve endangered and threatened species, to maintain natural flood protection thereby providing water quality while providing compatible public use. Areas currently protected under this program include: Ancient Oaks, Avalon Addition, Blind Creek, Bluefield Ranch, Indrio North Savannas, South Savanna Buffer Preserve, Kinds Island, North Fork of the St. Lucie River, Ocean Bay, Paleo Hammock, Spruce Bluff, Queen's Island, Pinelands, D.J. Wilcox Preserve, George LeStrange Preserve, Gordy Road Recreation Area, Lakewood Park Preserve, Sheraton Scrub, St. Lucie Village Heritage Park, Sweetwater Hammock Preserve, Teague Hammock, Walton Scrub, and Wildcat Cove.

⁸ St. Lucie County Environmental Resources Department, 2013

2.7 HISTORIC AND CULTURAL RESOURCES

According to the National Register of Historic Places, there are sixteen (16) designated places within St. Lucie County. Designated places include:

- Arcade Building, Fort Pierce
- Captain Hammond House, White City
- Casa Caprona, Fort Pierce
- Cresthaven, Fort Pierce
- Fort Pierce Old Post Office, Fort Pierce
- Fort Pierce Site, Fort Pierce,
- Immokolee, Fort Pierce
- Jules Frere House, Fort Pierce
- Moores Creek Bridge, Fort Pierce
- Old Fort Pierce City Hall, Fort Pierce
- Old St. Anastasia Catholic School, Fort Pierce
- St. Lucie High School, Fort Pierce
- Sunrise Theater, Fort Pierce
- Urca de Lima Shipwreck, Fort Pierce
- St. Lucie Village Historic District, St. Lucie Village
- Zora Neale Hurston House, Fort Pierce

Cultural events and festivals in St. Lucie County include the Fort Pierce Friday Fest, the Rainbow Festival, Seafood and Fishing Frenzy, the St. Lucie County Fair and St. Lucie Water Fest, Fort Pierce Farmers Market and others. The City of Fort Pierce currently participates in the Main Street program through two events: Fort Pierce Main Street and Lincoln Park Main Street.

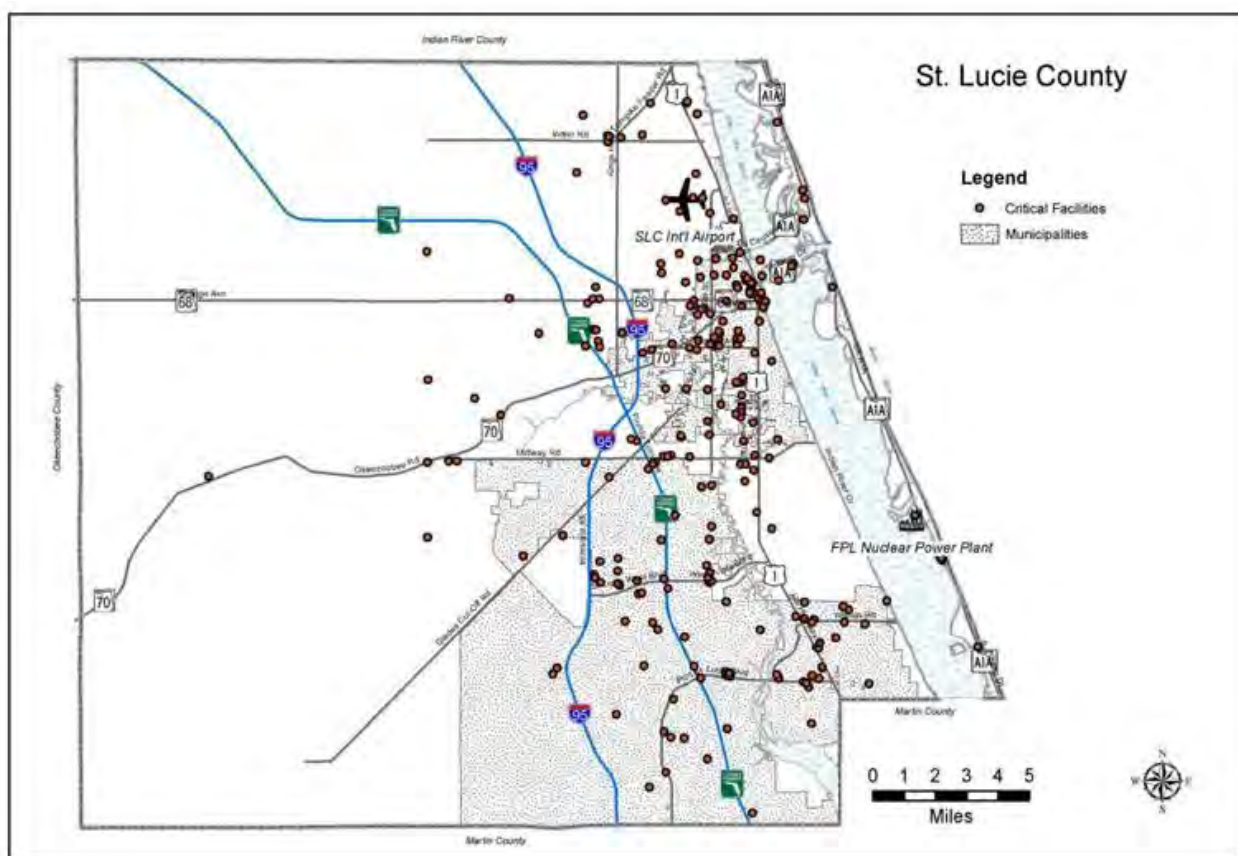
2.8 CRITICAL FACILITIES

The LMS Steering Committee developed and adopted a formal definition for the term “critical facility.” According to the adopted definition, “critical facilities comprise all public and private facilities deemed by a community to be mission critical and essential for delivery of vital services, protection of special populations and the provision of other services of importance for that community.” Critical facilities include: hospitals Assisted Living Facilities (ALF) nursing homes, and medical facilities, emergency operation centers;, key grocery stores; fuel dispensing stations, newspaper facilities, radio broadcasting facilities, Florida Division of Forestry offices, fire stations, law enforcement offices, schools, shelters, government offices, funeral homes, power generating plants, water treatment plants, waste water treatment plants, major water, storm-water, flood, and water control structures; airports, railways, port facilities, roadways classified as evacuation routes significant intersections and others as identified by the LMS Steering Committee.

The LMS Steering Committee differentiates between primary and secondary critical facilities for purposes of prioritization of proposed mitigation projects. Primary critical facilities are defined as; “facilities that are critical to the immediate support of life and public safety.” Examples of primary critical facilities include emergency operation centers (EOCs); emergency shelters; fire and police facilities; hospitals; and major utilities facilities (power generation plants, water and wastewater treatment plants, etc.).

Secondary critical facilities are defined as, “facilities that will be critical for community recovery and the restoration of services.” Some examples of secondary critical facilities include government offices, key grocery stores, newspaper facilities, and non-shelter schools. **Appendix B – Critical Facilities and Hazards** includes a table that shows St. Lucie County public facilities and their vulnerabilities to selected hazards developed for the Treasure Coast Regional Evacuation Study.

Figure 2.4: Critical Facilities Map - St. Lucie County



Source: St. Lucie County Growth Management Department 2009

St. Lucie County is home to three major hospitals, Lawnwood Regional Medical Center in Fort Pierce and the St. Lucie County Medical Center and Martin Health in Port St. Lucie. Other major medical facilities within St. Lucie County include Lawnwood Pavilion, Savannahs Hospital and New Horizons of the Treasure Coast. As of 2015, St. Lucie County had a total of 49 assisted living facilities with a total of 1,021 beds and 9 nursing homes with 1,050 beds.

Lines of communication are critical in providing information to the public before, during and after a disaster. The FCC (Federal Communications Commission) lists three (3) AM and twelve (12) FM radio stations broadcasting in St. Lucie County AM stations include: WJNX AM 1330, WIRA AM 1400, WPSL AM 1590. FM stations include: WQCS 88.9, WSCF 91.9, WAVW FM 92.7, WGYL 93.7, WLDI 95.5, WKGR 98.7, WEHR 100.7, WHLG 101.3, WPBZ 103.1, WQOL 103.7, WFLM 104.5 and WIRK 107.9.

Television stations locally include WPTV (NBC), WPEC (CBS), WPBF (ABC) and WFLX (FOX). Locally printed newspapers include; The St. Lucie News Tribune (TCPalm), Hometown News, the Treasure Coast Business Journal, and The Miami Herald.

SECTION 3.0

INSTITUTIONAL ANALYSIS

SECTION 3.0 UPDATES

- Section 3.1.1.3: *Community Rating System (CRS)*; Added Table for jurisdictional rating and % discount for respective governments.
- Subsection 3.1.1.4: *Map Modernization*, added FEMA program goals.
- Subsection 3.1.1.5: *FMA (Flood Mitigation Assistance)*; updated and strengthened description.
- Subsection 3.1.1.8: *Army Corps of Engineers*; added additional discussion on ACOE, Lake Okeechobee and breach risks.
- Section 3.4.1: *Regional Government*; added more thorough discussion of regional government and the Treasure Coast Regional Planning Council; contract programs in partnership with the State, local governments, St. Lucie County Department of Public Safety/Division of Emergency Management and the Local Emergency Planning Committee (LEPC). Added reference to the Strategic Regional Policy Plan (SRPP) and goals that support mitigation efforts.
- Section 3.5.1: *Health Department*; added paragraph on Center for Disease Control (CDC) and Strategic National Stockpile (SNS) as an asset/resource in response and recovery.
- Section 3.5.3: *County Mitigation Projects*; updated section with multiple recent county mitigation projects – ongoing and completed.
- Section 3.8: *Intergovernmental Coordination*; expanded and updated entire section.
- Section 3.8.1: expanded Transportation Planning Organization (TPO) description and roles.
- Section 3.8.6: updated entire school discussion with number of schools, types and mitigation strategies.
- Section 3.8.7: *Municipality Mitigation*; updated 4 municipalities discussion of mitigation strategies, ongoing and completed projects: City of Fort Pierce, City of Port St. Lucie, St. Lucie County and Town of St. Lucie Village.
- Section 3.9: *Strengthening the Role of Local Governments*; comprehensive updated discussion of non structural mitigation techniques; comprehensive plan, community outreach and education, etc.
- Table 3.1: Added Table 3.1 - National Flood Insurance Plan Summary per Jurisdiction
- Table 3.2: Added Table 3.2 - CRS per Jurisdiction

3.0 INSTITUTIONAL ANALYSIS

In the mitigation planning process, it is not only important to identify which hazards a community is at risk from, it also is important to identify the resources and capacities the community has available to prepare for, mitigate against, respond to, and recover from natural, technological, and/or societal hazards. This section outlines the current resources available to St. Lucie County to reduce risks posed by the hazards identified in the previous section. Mitigation programs, policies, and projects at federal, State, regional, and local levels are described and documented in this section. Sources of intergovernmental coordination, methods of strengthening the role of local governments, and background on private sector involvement also are documented.

3.1 FEDERAL GOVERNMENT

3.1.1 Federal Emergency Management Agency (FEMA)

FEMA is the lead federal role in natural hazard mitigation, preparedness, response, and recovery. FEMA has several programs aimed at reducing risks posed by natural hazards in communities nationwide.

3.1.1.1 Post Disaster Mitigation Program (PDM)

The PDM Program was authorized by Section 203 of the Robert T. Stafford Disaster Assistance and Emergency Relief Act (Stafford Act), 42 USC, as amended by Section 102 of the Disaster Mitigation Act of 2000. Funding for the program is provided through the National PDM Fund to assist states and local governments in implementing cost-effective hazard mitigation activities that complement a comprehensive mitigation program. The Act establishes criteria for State and local hazard mitigation planning. Local governments applying for PDM funds through the State must have an approved LMS Plan prior to approval of local mitigation project grants. FEMA also requires that the State of Florida have an approved State Hazard Mitigation Plan in order to receive PDM funds for State or local mitigation projects.

3.1.1.2 National Flood Insurance Program (NFIP)

The U.S. Congress established the NFIP with the passage of the National Flood Insurance Act of 1968 (NFIP). The NFIP is a federal program enabling property owners in participating communities to purchase insurance as a protection against flood losses in exchange for State and community, floodplain management policies and regulations that intend to reduce future flood damages. Participation in the NFIP is based on an agreement between communities and the federal Government. If a community adopts and enforces a floodplain management ordinance(s) to reduce future flood risks to new construction in floodplains. The federal Government will make flood insurance available within the community as a financial protection against flood losses. This insurance is designed to provide an insurance alternative to disaster assistance to reduce the escalating costs of repairing damage to buildings and their contents caused by floods.

St. Lucie County, the City of Fort Pierce, the Town of St. Lucie Village, and the City of Port St. Lucie are participating communities in the NFIP Program. Each jurisdiction within the county is an active participant in the NFIP. In an effort to ensure continued compliance with the NFIP, each participating community will:

1. Continue to enforce their adopted floodplain management ordinance requirements, which include regulating all new development and substantial improvements in Special Flood Hazard Areas (SFHA).
2. Continue to maintain all records pertaining to floodplain development, which shall be available for public inspection.
3. Continue to notify the public with proposed changes to the floodplain ordinance or Flood Insurance Rate Maps (FIRM).
4. Maintain the FIRM map and Letter of FIRM Map Change repositories.
5. Continue to promote flood insurance for all properties.
6. Continue their Community Rating System (CRS) public outreach programs, as applicable.

Table 3.1; National Flood Insurance Program Summary per jurisdiction, below shows effective dates for the initial identification, the initial Flood Insurance Rate Map areas identified and the current effective map date for each jurisdiction with in St. Lucie County.

Table 3.1- National Flood Insurance Program Summary per Jurisdiction

CID #	Community	Initial Identification	Initial FIRM	Current Effective Map Date
120286	Fort Pierce	05/24/74	12/01/77	02/16/12
120287	Port St. Lucie	12/13/74	03/15/82	02/16/12
120288	St. Lucie Village	11/29/74	04/01/80	02/16/12
120285	County Unincorporated	01/24/75	08/17/81	02/16/12

Source: FEMA; Federal Emergency Management Agency Community Status Book Report, Florida; April, 2016

3.1.1.3 Community Rating System (CRS)

The NFIP's CRS was implemented in 1990 as a program for recognizing and encouraging community floodplain management activities that exceed the minimum NFIP standards through voluntary incentives. Depending upon the level of participation, flood insurance premium rates for policyholders can be reduced up to 45%. Under the CRS, flood insurance premium rates are adjusted to reflect the reduced flood risk resulting from community activities that meet the three goals of the CRS: 1) reduce flood losses; 2) facilitate accurate insurance rating; and 3) promote the awareness of flood insurance. There are 10 CRS classes: Class 1 requires the most credit points and gives the largest premium reduction; Class 10 receives no premium reduction. The CRS recognizes 18 creditable activities, organized under four categories numbered 300 through 600: Public Information, Mapping and Regulations, Flood Damage Reduction, and Flood Preparedness.

Table 3.2- Community Rating System per Jurisdiction

Community Number	Community	CRS Entry Date	Current Effective Date	Current Class	% Discount for SFHA
120286	Fort Pierce	10/01/92	5/01/12	6	20
120287	Port St. Lucie	10/01/91	10/01/96	8	10
120285	County Unincorporated	10/01/94	05/01/09	6	20

Source: FEMA; Federal Emergency Management Agency Community Rating System, Eligible Communities, Florida; May, 2014

3.1.1.4 Map Modernization (Map Mod)

Flood Map Modernization (Map Mod), is a multiyear Presidential initiative funded by Congress from fiscal year (FY) 2003 to FY 2008, improved and updated the nation's Flood maps and provided 92 percent of the nation's population with digital Flood Insurance Rate Maps. Map Mod introduced a new way of doing business and laid the foundation for the FEMA's (Department of Public Safety) Risk Mapping, Assessment and Planning (Risk MAP) program. Map Mod used state-of-the-art technology and advanced engineering to increase the quality, reliability, and availability of Flood hazard maps and data, as well as employed a collaborative process to involve state, regional and local partners in mapping tasks.

In addition to providing more accurate and up-to-date flood hazard information, Map Mod enhanced community officials and citizens' decision-making and their ability to manage risks and other issues locally.

The goal of FEMA's Map Modernization Plan is to upgrade the 100,000 panel flood map inventory by:

- developing up-to-date flood hazard data for all flood prone areas nationwide to support sound floodplain management and prudent flood insurance decisions; and
- providing the maps and data in digital format to improve the efficiency and precision with which mapping program customers can use this information; and
- fully integrating FEMA's community and State partners into the mapping process to build on local knowledge and efforts; and
- improving processes to make it faster to create and update the maps; and
- improving customer services to speed processing of flood map orders and raise public awareness of flood hazards.

3.1.1.5 Flood Mitigation Assistance Program (FMA)

The goal of the FMA program is to reduce or eliminate claims under the NFIP. FMA provides funding to assist states and communities in implementing measures to reduce or eliminate the long-term risk of flood damage to buildings, manufactured homes, and other structures insurable under the NFIP. There are three types of grants available under FMA: Planning, Project, and Technical Assistance Grants. There are three types of FMA grants available to applicants:

- Planning Grants: to prepare Flood mitigation plans.
- Project Grants: to implement measures to reduce flood losses, such as elevation, acquisition or relocation of NFIP: insured structures.
- Management Cost Grants: for the grantee to help administer the FMA program and activities.

3.1.1.6 National Hurricane Program (NHP)

The (NHP) conducts and supports many projects and activities that help protect communities and their residents from hurricane hazards. Three key components of the Program are Response and Recovery; Planning, Training, and Preparedness; and Mitigation. Established in 1985, the NHP also conducts assessments and provides tools and technical assistance to State and local agencies in developing hurricane evacuation plans. The program is a multi-agency partnership involving numerous federal agencies

3.1.1.7 Other Programs

The National Mitigation Strategy was developed to provide a framework for reducing the exposure of all Americans to the catastrophic losses caused by natural disasters. In addition, The Department of Public Safety sponsors the Mitigation Assistance, Disaster Preparedness Improvement Grant, Community Assistance, and Fannie Mae Pilot Loan Programs.

3.1.2 United States Environmental Protection Agency (EPA)

The EPA is the lead federal agency for hazardous materials issues and planning. The EPA is responsible for implementing the Emergency Planning and Community Right-to-Know Act (EPCRA). EPCRA establishes requirements for federal, State, and local governments, Native American tribes, and industry regarding emergency planning and "Community Right-to-Know" reporting on hazardous materials and toxic chemicals. The Community Right-to-Know provisions increase the public's knowledge and access to information on chemicals at individual facilities, their storage, risk and vulnerability analyses, inventory amounts and , historical releases into the environment. States and communities, working with facilities, can use the information to improve chemical safety and protect public health and the environment. The EPA also sponsors several grant programs focusing on environmental health, including Clean Water Act Section 319 Grants, Brownfields Economic Redevelopment Grants, and the Sustainable Development Challenge Grant.

3.1.3 United States Forest Service (USFS)

The Fire and Aviation Management part of the USFS is a diverse group of people working to advance technologies in fire management and suppression, maintain and improve the extremely efficient mobilization and tracking systems in place, and reach out in support of our Federal, State, and international fire partners.

3.1.4 United States Fish and Wildlife Service (USFWS)

The USFWS oversees the implementation of the Coastal Barrier Resources Act (CBRA). The purpose of the CBRA was to eliminate Federal development incentives on undeveloped coastal barriers, thereby preventing the loss of human life and property from storms, minimizing Federal expenditures, and protecting habitat for fish and wildlife. Coastal barriers are landscape features that protect the mainland, lagoons, wetlands, and salt marshes from the full force of wind, wave, and tidal energy.

3.1.5 United States Department of Commerce (DOC)

The National Oceanic and Atmospheric Administration (NOAA) located within the DOC conducts research and compiles data on global oceans, atmosphere, space, and sun, and applies this knowledge to science and service. The DOC manages the Coastal Zone Management Program on the national level. The Economic Development Administration (EDA) within the DOC administers EDA Public Works & Infrastructure Development Grants to promote long-term economic development and assist in the construction of public works and development facilities needed to initiate and support the creation or retention of permanent jobs in the private sector in areas experiencing substantial economic distress.

3.1.6 National Weather Service (NWS)

The NWS provides weather, hydrologic, and climate forecasts and warnings for the United States, its territories, adjacent waters, and ocean areas, for the protection of life and property and the enhancement of the national economy. NWS data and products form a national information database and infrastructure, which can be used by other governmental agencies, the private sector, the public, and the global community.

3.1.7 United States Geological Survey (USGS)

The USGS serves the nation by providing reliable scientific information to describe and understand the earth; minimize loss of life and property from natural disasters; manage water, biological, energy, and mineral resources; and enhance and protect our quality of life.

3.1.8 United States Army Corps of Engineers (USACE)

In addition to building projects, the Corps of Engineers, through its Flood Plain Management Services, advises communities, industries, and property owners on protection measures they can take themselves, such as zoning regulations, warning systems, and flood proofing. The value of property protected by this program is an estimated \$6.2 billion. USACE also manages beach erosion control projects, aquatic restoration programs, floodplain management initiatives, and emergency bank protection projects. Lake Okeechobee, southwest of St. Lucie County is managed by the ACOE. Releases of freshwater to the Indian River Lagoon affect the environment and commercial marine businesses and these release events directly affect the economic conditions in the County. Recently (2016) the Governor of Florida declared a state of emergency in St. Lucie County.

3.1.9 United States Fire Administration (USFA)

As an entity of the Department of Homeland Security and FEMA, the mission of the USFA is to reduce life and economic losses due to fire and related emergencies, through leadership, advocacy, coordination, and support.

3.1.10 National Response Team (NRT)

The NRT is made up of 15 Federal agencies, each with responsibilities and expertise in various aspects of emergency response to pollution incidents. With nationwide responsibilities for interagency planning, policy, and coordination, the NRT ensures that the most valuable tool in an emergency-readiness is available for pollution incidents of all sizes and kinds. Prior to an incident, the NRT provides policy guidance and assistance. During an incident, the NRT provides technical advice and access to resources and equipment from its member agencies. The EPA serves as chair of the NRT, and the U.S. Coast Guard (USCG) serves as vice-chair. This interagency planning and coordination framework is replicated at the regional, sub-regional, and local levels. In addition to interagency coordination, the NRT also engages the private sector in prevention, preparedness, and response efforts. The NRT encourages innovation and collaboration to increase the effectiveness and reduce the cost of industry compliance with planning and response regulations. The NRT receives no direct appropriations for its activities.

3.1.11 United States Department of Housing and Urban Development (HUD)

HUD sponsors a number of programs that can be used to further the goals of hazard mitigation within a community. The Community Development Block Grant (CDBG) Small Cities Program provides funding to improve local housing, streets, utilities, and public facilities in small cities. Disaster Recovery Initiative funds are provided for disaster relief, long-term recovery, and mitigation activities in areas affected by a presidential disaster declaration.

3.1.12 United States Department of the Interior (USDOl)

USDOl sponsors several programs that can help further mitigation. The federal Land-to-Parks Transfer Program provides funds to identify, assess, and transfer available surplus federal real property to State and local entities for use as parks, recreation areas, and open space. USDOl supports land acquisition programs, the North American Wetland Conservation Fund, Partners for Fish and Wildlife, and the Rivers, Trails, and Conservation Assistance Program.

3.1.13 United States Department of Agriculture (USDA)

USDA sponsors the following hazard-related programs: Emergency Watershed Protection Program, Watershed Surveys and Planning, Small Watershed Program, and Rural Utilities Service Water and Waste Disposal Program.

3.1.14 United States Department of Transportation (DOT)

The Federal Highway Administration sponsors a transportation enhancement program that provides funds for transportation enhancements. The Federal Transit Administration offers funding programs related to transportation capital expenses including Section 5309 Capital Funds. DOT sponsors the Hazardous Materials Emergency Preparedness Grant which allows regional LEPCs to provide hazardous materials response training to St. Lucie County Fire District hazmat teams. This grant also allows LEPC planners to conduct planning projects that support vulnerability and risk assessments that are transportation related.

3.2 NON-GOVERNMENT

3.2.1 Fire wise Communities USA

Fire wise Communities/USA is a project of the National Wildfire Coordinating Group's Wild land/Urban Interface Working Team and is the newest element of the Fire wise Program. It provides citizens with the knowledge necessary to maintain an acceptable level of fire readiness, while ensuring firefighters that they can use equipment more efficiently during a wild land fire emergency. The program draws on a community's spirit, its resolve, and its willingness to take responsibility for its ignition potential.

3.2.2 Institute for Business and Home Safety (IBHS)

IBHS is a nonprofit association that engages in communication, education, engineering, and research. The goal of IBHS is to reduce deaths, injuries, property damage, economic losses, and human suffering caused by natural disasters.

3.2.3 Red Cross

Although the Red Cross is not a government agency, its authority to provide disaster relief was formalized when, in 1905, the Red Cross was chartered by Congress to "carry on a system of national and international relief in time of peace and apply the same in mitigating the sufferings caused by pestilence, famine, fire, floods, and other great national calamities, and to devise and carry on measures for preventing the same."

3.2.4 National Fire Protection Association (NFPA)

The mission of the international nonprofit NFPA is to reduce the worldwide burden of fire and other hazards on the quality of life by providing and advocating scientifically-based consensus codes and standards, research, training, and education.

3.2.5 Association of State Floodplain Managers (ASFPM)

ASFPM goals include reducing the loss of human life and property damage resulting from flooding, preserving the natural and cultural values of floodplains, promoting flood mitigation for the prevention of loss and the wise use of floodplains, and avoiding actions that exacerbate flooding.

3.3 STATE GOVERNMENT

3.3.1 Florida Department of Economic Opportunity (DEO)

The FDEO is the State's land planning agency. It is comprised of a number of divisions, including the Bureau of Community Planning and Development. The DEO is responsible for reviewing and approving counties' Comprehensive Growth Management Plans. Additionally, if questions are posed over Land Development Regulations, the DEO will review the item to determine the appropriate application of the regulation.

3.3.2 Florida Department of Emergency Management (FDEM)

The FDEM has the lead role in coordinating State resources to support local government unless the scope of the emergency warrants a higher degree of State involvement. This may occur when emergencies involve multi-jurisdictional hazards, when local governments believe the emergency is beyond the capabilities of local resources, or when the Governor determines there is an overriding concern for the safety of the public. For these situations, the Governor can designate the primary responsibility for emergency response to the State by issuing an Executive Order under the provisions of Section 252.36, Florida Statutes.

The FDEM is the designated State Watch Office in the event of emergencies, including incidents such as hazardous materials releases. As such, the FDEM is responsible for receiving notification of an emergency from the County Communications Coordinator, and coordinating request(s) for County support, if requested. The FDEM is responsible for assisting LEPCs in providing warnings and instructions to the general public. Other FDEM programs include the Emergency Management Preparedness and Assistance Grant, Residential Construction Mitigation Program, and the Florida Warning and Information Network.

3.3.3 Florida Forest Service (FFS)

Over the past several years, extensive damage has resulted from wildland fire. The FFS has major responsibility for protecting forest lands and the public from the effects of wildland fire. Local fire-rescue departments have primary responsibility for structural fires. They also are the first responders to all fires. If the local fire department has determined that the wild land fire event is beyond its capacity to fight, the local Fire department can request assistance from the FFS. When that occurs, an incident command is established with the State and local Fire departments working together to extinguish the wildland fire.

3.3.4 Florida Department of Environmental Protection (FDEP)

The DEP Bureau of Beaches and Wetland Resources oversee the listing of critical erosion areas within the State. The Florida Geological Survey, housed in DEP, is the State lead on geologic hazards such as sinkholes. FDEP sponsors two key mitigation-related funding programs - the Revolving Fund Loan Program for wastewater treatment and the Pollution Control Bond Program. DEP also is home to the State Coastal Management Program.

The Florida Coastal Management Program (FCMP) is based on a network of agencies implementing 24 statutes that protect and enhance the state's natural, cultural and economic coastal resources. FCMP coordinates local, State, and federal entities involved in coastal management activities. In addition to working with FDEP's programs, the FCMP coordinates among the eight State agencies, five water management districts, and local governments that have responsibilities for coastal management under the federally approved FCMP. The FCMP also develops partnerships with local communities to actively solve problems related to coastal development.

3.3.5 Florida Fish and Wildlife Conservation Commission (FWC)

The FWC sponsors environmental education programs aimed at educating adult Floridians about population growth, habitat loss, and coastal and fresh water ecosystems.

3.3.6 Florida Inland Navigation District (FIND)

FIND provides assistance on certain waterway-related projects including navigation channel dredging, channel markers, navigation signs or buoys, boat ramps, docking facilities, fishing and viewing piers, waterfront boardwalks, inlet management, environmental education, law enforcement equipment, boating safety programs, beach re-nourishment, dredge material management, environment mitigation, and shoreline stabilization.

3.3.7 Florida Department of Transportation (FDOT)

FDOT maintains federal and State roads as well as airport construction and zoning and various other types of transportation administration.

3.3.8 Building Officials Association of Florida (BOAF)

BOAF coordinates building code enforcement among local building officials.

3.3.9 Florida Department of Insurance (FDOI)

FDOI helps finance the reconstruction of communities following a disaster.

3.3.10 Agency for Health Care Administration

Agency for Health Care Administration oversees hospital construction and various health testing services.

3.3.11 Florida Department of Business and Professional Regulation (FDBPR)

FDBPR oversees elevator maintenance and safety, building inspection, engineering, architecture, and construction contractors.

3.3.12 Florida Department of Corrections (FDOC): FDOC builds prisons, local detention facilities, and private contract facilities.

3.3.13 Florida Department of Education (FDOE): FDOE oversees school construction and maintenance. The Department also has an emergency planning program that focuses on hazardous materials accident preparedness.

3.3.14 Florida Department of Management Services (FDOMS) FDOMS manages State public buildings and personnel services.

3.3.15 Florida Department of State (FDOS): The Division of Historical Resources is one of seven divisions within the Department of State, and agency responsible for promoting the historical, archaeological, museum, and folk culture resources in Florida. The Division Director serves as Florida's State Historic Preservation Officer, providing a liaison with the National Historic Preservation Program conducted by the National Park Service. The Bureau of Historic Preservation identifies, evaluates, preserves, and interprets historic structures and properties that reflect the diversity of our past. The Bureau manages the nation's largest historic preservation grants program and oversees the development of State historic markers, heritage publications, and Florida folk life programs.

3.4 REGIONAL GOVERNMENT

3.4.1 Treasure Coast Regional Planning Council (TCRPC): The TCRPC was established under Florida Statutes, Section 186.501, (F.S.) The Council is a multi-county entity covering Indian River, Martin, Palm Beach, and St. Lucie counties. It has major responsibility for addressing multi-jurisdictional growth management issues. Key roles include engaging local governments in area-wide comprehensive and functional land-use, ecological, transportation and emergency management planning. The TCRPC Emergency Programs department works in cooperation with federal and State and local governments in preparedness planning for disasters as described in Section 252.34(4), F.S.

The TCRPC Emergency Programs Director acts as the Treasure Coast LEPC coordinator and administers the federal Emergency Community Right-To-Know Act (EPCRA) and several State of Florida grant programs. The LEPC is the regional repository for chemical facility annual Tier II reporting and the Coordinator ensures facility compliance between local facilities and the State Emergency Response Commission (SERC) for hazardous materials. The LEPC membership is composed of county and municipal first responders, facility owner/operators, administrators and planners guided by EPCRA, FEMA, SERC guidance in hazardous materials preparedness and response for chemical releases. The LEPC retains representation on the State Training Task Force and actively administers hazardous materials training to the region for all levels of response and emergencies;

Mitigation efforts in the County and region include: updating and maintaining the Treasure Coast LEPC Regional Hazardous Materials Response Plan that outlines response to hazardous materials incidents; hazardous materials training for first response personnel; hospital and hazmat teams; public outreach and education for hazardous chemical awareness, shelter in place, workshops, drills and exercises engaging public and private departments and organizations; and technical assistance to public and private facilities with chemical emergency preparedness planning.

Section 186.507, F.S. directs regional planning councils to prepare strategic regional policy plans. One of the elements the plan must address is emergency preparedness. The TCRPC promotes mitigation initiatives within Section 5.0 - Emergency Preparedness, of the Strategic Regional Policy Plan. Specific strategies that promote mitigation are summarized in the below strategies.

- Strategy 5.1.1: Direct development away from areas most vulnerable to the effects of natural and manmade disasters.
- Strategy 5.2.1: Utilize land use, transportation, and community planning processes to address vulnerability issues.
- Strategy 5.3.1: Provide shelter space for residents of areas susceptible to flooding from the effects of hurricanes and other storms.
- Strategy 5.4.1: Develop the mechanisms necessary to ensure that emergency planning agencies have input into the local government decision-making process.
- Strategy 5.5.1: Initiate disaster preparedness activities that will protect lives and property and reduce evacuation times.
- Strategy 5.5.2: Establish mechanisms and regulations necessary for post-disaster reconstruction to occur in a consistent manner, making future disasters less destructive to life and property.

3.4.2 South Florida Water Management District (SFWMD)

The creation of the SFWMD along with four other water management districts was enabled under Section 373.069, Florida Statutes. As required under Section 373.036(2), Florida Statutes, each district has prepared a district water management plan. The plan provides overarching vision for the districts. Historically, water management districts were created primarily to mitigate the impacts of flooding. Over the years, the district's roles have been expanded considerably. For example, all districts must address four key areas:

- Environmental protection and enhancement;
- Maintaining the water supply;
- Flood protection; and
- Water quality protection.

One of the purposes of the plan is to provide a framework for managing conditions of extreme drought, hurricanes, and flooding. The SFWMD administers several programs that achieve hazard mitigation relative to these events. These are supported by Strategic Goals and Policies found in the District Water Management Plan such as:

Strategy 1.1.1 Needs and Sources, Planning: The District will prepare coordinated and standardized forecasts of future water demands, withdrawal impact, and future water levels by:

- Utilizing statistical forecasting methods to evaluate ground and surface water resources, and to aid in the water shortage management process; and,
- Utilizing numerical ground water flow models and surface water seasonal water balance models for prediction of future water resource availability under varying climatic and demand conditions.
- The District will establish efficiency standards for routine urban demand management and conservation practices and criteria for implementing the same, including xeriscape, efficient plumbing in new construction, and minimum water conservation planned for utilities.

Strategy 1.1.2 Needs and Sources, Regulation: The District will require water conservation and efficient use of water supplies.

Strategy 2.1.1 Flood Protection, Planning: The District will assist local governments in the planning and implementation of appropriate solutions to local Flood control problems and strategies for alleviating current problems and avoiding future problems. The District will encourage retrofit projects to meet new development standards for Flood protection and water quality, to the maximum extent feasible.

Strategy 2.1.2 Flood Protection, Operations and Maintenance

- The District will, through its publications and external communications, seek to create a greater public awareness of the importance and availability of Flood protection.
- The District will communicate, in its Emergency Management Plan, District operations, intergovernmental coordination activities and resource management priorities that correspond to severe climatological events.
- The District will perform emergency services, as necessary, to garnish available capacity of Central and Southern Florida Project works to other entities.
- The District will perform other Flood control services on an as needed or emergency basis as determined by the District.

Strategy 2.2.1 Floodplains, Planning

The District will encourage non-structural methods, including acquisition, regulation and application of appropriate land use and water management policies, to address or prevent water resource problems. The District will assist local governments in the planning and implementation of appropriate solutions to local Flood control problems and strategies for alleviating current problems and avoiding future problems.

Strategy 2.2.2 Minimum Flows and Levels, Regulation

The District will optimize surface water management control elevations in storm water management systems to meet Flood control standards, conserve water supply and protect natural systems.

In addition, the District has an emergency management program. The purpose of the program is to prevent or minimize, prepare for, respond to, and recover from emergencies or disasters that threaten life or property within the boundaries of the SFWMD.

The SFWMD operates and maintains the regional drainage system throughout most of its jurisdictional area. Local drainage systems are operated by a variety of special districts, private property owners, and local governments. The local systems typically convey water from individual projects to the regional system operated by the SFWMD. The District's responsibilities for flood protection relate primarily to their serving as the regional water conveyance and storage entity. To meet this responsibility, the SFWMD maintains an ongoing Canal Conveyance Capacity Evaluation Program. The objectives of this program are as follows:

- To implement a systematic approach to the inspection of all SFWMD canals
- To determine the need for periodic dredging;
- To inspect all canals over a 5-year period;
- To establish standard canal survey criteria; and
- To develop construction plans and specifications to implement restoration of conveyance to the canals.

In addition to private applicants, local units of government involved in building new storm-water systems or retrofitting older ones are required to petition the District for a surface water management permit approval.

Besides flood control, the District is charged with the responsibility of protecting existing water resources from excessive drawdown during periods of drought, and protecting well fields from contamination. Well field contamination is addressed in the following Strategic Goals and Policies from the District Water Management Plan:

Strategy 3.1.2 Surface Water, Regulation

The District will adopt and implement criteria to prevent the movement of contaminants exceeding state standards in surface water systems during withdrawal of source water and discharge of used water.

Strategy 3.2.1 Ground Water, Planning

The District will encourage linkage of ground water quality and quantity limits with local government land use decisions.

Strategy 3.2.2 Ground Water Regulation

The District will manage water withdrawals to minimize saltwater intrusion or upconing of saline water. The District also administers the "Save Our Rivers" Program for the purpose of protecting environmentally sensitive lands. Some of the lands purchased under the program have been situated in the Coastal High Hazard Area (CHHA); thus, in addition to achieving the program's primary goal - the protection of environmentally sensitive resources - the intensity and density of development in CHHAs are reduced.

3.5 COUNTY GOVERNMENT

3.5.1 Listing of County Departments and Agencies

Within the existing County organizational structure, there are a number of departments that play key roles in hazard mitigation. They include the Department of Public Safety - Division of Emergency Management, Grants/Disaster Recovery Department, Growth Management Department, Utilities Department, Department of Public Works, Department of Community Services, Fire- District, and the Sheriff's Office. Below is a brief description of each of the departments/division/district.

Department of Public Safety (DPS): The DPS has two major functions: emergency management and 911 communication and dispatch. In terms of hazard mitigation, the Division of Emergency Management has the lead role in coordination for hazard-related events. In that role, one of the Division's important functions involves overall coordination responsibility during emergency events. The County Comprehensive Emergency Management Plan (CEMP) serves as the countywide operational management plan for emergency events. It defines the roles and functions of all local governmental agencies and non-profit and private sector entities (e.g., Red Cross, Florida Power & Light). The County Division of Emergency Management is responsible for maintaining the County's LMS Plan, with the Emergency Management Coordinator serving as the LMS Coordinator.

The department is tasked with assisting the County recover financially from disaster events by securing disaster relief funding from State, federal and other grant sources. The Department serves as the County's liaison to FDEM, FEMA, and other disaster relief agencies when applying for State and federal disaster relief funding. The Department coordinates and the application for State and federal hazard mitigation grant funding.

Department of Planning and Development Services: This department is comprised of the Current Planning Section, Long Range Planning Section and the Towns, Villages, and Countryside (TVC) Planning Section. Planning and Development Services ensures that land use planning and economic development occur in a rational and quality manner. In addition, the Department aims to achieve and maintain the desired level of service of public facilities and services concurrent with development. The Department is responsible for the review of all site plan and development review applications through the Development Review Committee (DRC).

Utilities Department: This Department is responsible for managing all County-owned water and wastewater facilities systems. This department is also responsible for customer billing. The Utility evaluates and plans for the improvements and expansion of our water, wastewater, and reclaim water systems to meet the needs of our current and future customers in compliance with County and State Regulations.

Department of Public Works (DPW): The DPW is responsible for designing, constructing, and maintaining drainage projects, roads and bridges, and street improvements, as well as for facilities that control vehicular and pedestrian traffic.

Department of Community Services: This Department administers several functions that have relevance to the LMS, including social service support, housing, and transportation. The Department has primary responsibility for Emergency Support Function#15 - (Volunteers and Donations) responsible for coordinating the information phone bank, assisting supply distribution, and matching residents with available resources. As the Disaster Housing Coordinator, the department coordinates home repairs and mitigation programs. As the County's Community Transit Coordinator, Community Services provides, through a service agreement with the Council on Aging, transportation to the special needs shelter for those individuals with medical conditions.

Fire District: The County Fire District provides fire suppression, hazardous materials response emergency medical and rescue services, fire prevention, and community education countywide. During declared emergencies, Fire-Rescue fulfills all activities related to Emergency Support Function (ESF) #4, (Fire Fighting) ESF #9 (Search and Rescue) and ESF #10 (Hazardous Materials) as described in the County's CEMP.

Besides emergency services, the District provides other types of services. The District is responsible for ensuring that buildings comply with appropriate fire codes. The District also offers public education programs that focus on fire safety guidelines for schools, community groups, and individuals. In addition, the District has responsibility for coordination of fire protection, hazardous materials mitigation, and advance life support services.

Sheriff's Office: The Sheriff's Office is responsible for public safety, law enforcement functions, civil process, court security and operation of the county jail. During a declared emergency the office serves and is responsible for ESF #16 (Law Enforcement and Security) and plays a role in numerous other support functions.

Its disaster responsibilities include traffic control, search and rescue, security for sites such as emergency shelters, Emergency Operations Center (EOC), command posts, distribution centers, and staging areas. In addition the office has operational standard operations procedures/plans for disaster and hazardous responses including but not limited to terrorist activity, crisis situations and response, search and rescue operations, including marine operations. The Sheriff's Office also maintains an Emergency Management and Mobilization Plan, which focuses primarily on weather related incidents or catastrophic disasters. Plans are in place for jail/corrections disasters and evacuations if required. The Sheriff's Office participated and is included in the County Continuity of Operations Plan (COOP) for the Sheriff's Office Administration building.

St. Lucie School District: The School District is responsible for ESF #1 (Transportation) in disaster events. Its large fleet of school buses is an important resource should mass movement of the population away from the area or site impacted by the hazard be necessary. The District also provides transportation for other ESF functions. The District operates independently from County government; however, is a major provider of public shelter space.

Florida Department Health in St. Lucie County: The Health Department is responsible for Emergency Support Function #8 (Health and Medical Services) in all emergency events. It is tasked with disease prevention, potable water supplies, protection of available food supply and assistance with the damage assessment of health facilities. The Health Department maintains the following plans: Pandemic Plan, All Hazards Operational Plan, Point Distribution Plan, Severe Acute Respiratory Syndrome (SARS) Response Plan, Emergency Operations Plan, Small Pox Response Plan, and Potassium Iodide Distribution Plan. In addition, the Health Department coordinates with the Center for Disease Control (CDC) for access and distribution of the Strategic National Stockpile (SNS) in cases of mass prophylaxis.

Policy Plans: Two key policy plans that address issues related to natural and technological hazards include the County Comprehensive Plan and the County Comprehensive Emergency Management Plan (CEMP) and are described briefly below.

1) St. Lucie County Comprehensive Plan

The Comprehensive Plan serves not only as a blueprint for St. Lucie County's future, but also as the County's policy document. It defines County positions as they relate to development and redevelopment. The Comprehensive Plan contains the nine required plan elements, as set out in Section 163.3161, F.S. They include Conservation, Coastal Management, Infrastructure (i.e., potable water, sanitary sewer, storm-water management, solid waste, natural aquifer recharge), Future Land Use, Housing, Recreation and Open Space, Transportation, Intergovernmental Coordination, and Capital Improvement. The issue of hazards is dealt with in five of the nine plan elements. Natural hazards, primarily flooding, hurricanes, drought, and beach erosion, are the focus of the Comprehensive Plan. Technological-type hazards such as aquifer contamination, wellfield contamination, and hazardous materials/waste accidents are addressed in several elements.

2) St. Lucie County Comprehensive Emergency Management Plan (CEMP)

The Board of County Commissioners has an adopted CEMP. It is an operations-oriented document that establishes the framework for effective management by the County during emergencies and disasters.

The CEMP is administered by the DPS, and is updated and maintained by the Emergency Management Coordinator. The CEMP addresses a broad range of hazards noted below.

- hurricanes and tropical storms
- flooding
- freezes
- wildland fires
- tornadoes
- droughts
- property loss
- agricultural hazards (pests and disease)
- hazardous materials
- sinkholes and subsidence
- nuclear power
- coastal oil spill
- dam failure
- military ordnance from World War II
- mass immigration
- armed violence (civil disturbance, terrorism, military conflict)

The CEMP addresses evacuation in terms of local and regional evacuation, public shelter, post-disaster response and recovery, rapid deployment of resources, communications and warning systems, training exercises, and agency responsibilities. These responsibilities are clearly delineated in 17 ESFs (**Table 3.3**). Each ESF is directed by a lead agency, which has been selected based on its authorities, resources, and capabilities in the functional area. The ESFs also serve as the primary mechanism through which outside assistance such as mutual aid and State and regional resources to St. Lucie County is coordinated.

Table 3.3: St. Lucie County Emergency Support Functions

Designation	Emergency Support Function
ESF #1	Transportation
ESF #2	Communications
ESF #3	Public Works & Engineering
ESF #4	Firefighting
ESF #5	Information & Planning
ESF #6	Mass Care
ESF #7	Resource Support
ESF #8	Health & Medical & Special Needs
ESF #9	Search & Rescue
ESF #10	Hazardous Materials
ESF #11	Food & Water
ESF #12	Energy
ESF #13	Military
ESF #14	Public Information
ESF #15	Volunteers & Donations
ESF #16	Law Enforcement & Security
ESF #17	Animal Protection/Agriculture

Source: St. Lucie County, 2016

The CEMP is comprised of the Basic Plan, Annexes and Appendices. The annexes and appendices components of the plan are listed in **Table 3.4**.

Table 3.4: CEMP Annexes and Appendices

Designation	Emergency Support Function
Annex I	Recovery Functions
Annex II	Mitigation
Annex III	Logistics
Appendix I	Herbert Hoover Dike Plan
Appendix II	Tropical Events/ Hurricanes
Appendix III	Severe Weather
Appendix IV	Terrorism Incident Response Plan
Appendix V	Wildfires
Appendix VI	Pandemics
Appendix VII	Radiological and Nuclear Incidents
Appendix VIII	Tsunami Warning and Evacuation Plan
Appendix IX	St. Lucie County Departments Agencies

Source: St. Lucie County, 2016

3) Post-Disaster Redevelopment Plan (PDRP): was developed in 2012 by the TCRPC in partnership with the County. The purpose of the PDRP is to embrace long-term community vision, establish post-disaster priorities, and identify actions that can be taken by public, private, and non-profit stakeholders in the aftermath of catastrophic disasters. The PDRP emphasizes seizing opportunities for hazard mitigation and community improvement consistent with the goals of the local comprehensive plan and participation of the citizens.

3.5.2 County Mitigation Projects/Initiatives

St. Lucie County has taken steps to mitigate potential impacts resulting from various types of hazards. Although not all inclusive, the following discussion provides some examples of the types of projects undertaken. There are a number of projects and initiatives implemented to mitigate potential damage impacts from incidents or disasters. The County has acquired a number of important parcels in the CHHA through local bond issue. The parcels were purchased because they exhibited environmentally significant habitat; however, the intent was to also reduce the intensity and density of development in a high risk area.

St. Lucie County also has made a statement of the importance of hazard mitigation, by incorporating within its Comprehensive Plan policy statements regarding the development of a countywide LMS. In addition to its CEMP, there are special hazard plans that apply to unique situations. They address hazards such as pandemic diseases, nuclear plant emergencies and airport safety. In addition, the Fire District participates in the review of development proposals with review criteria including personnel and apparatus access to buildings, and adequate vehicle ingress and egress.

The Fire District has a significant role relative to hazardous materials planning and response. The District pre-identifies facilities that store, transport or manufacture Extremely Hazardous Substances (EHS), create hazardous chemical wastes, conducts safety site visits and pre-plans emergency response. In addition, staff works with the facility managers by assisting in writing their emergency operations/evacuation plans.

The County's Environmentally Sensitive Land Ordinance was adopted in 1990 to mitigate erosion and enhance and restore the beaches and dunes along its coastal shorelines. The County avoids the use of shoreline armoring (except as a measure of last resort). Preferred alternatives include beach nourishment and dune restoration. Erosion along its inland waterways, (i.e., North Fork of the St. Lucie River, Five Mile Creek, Ten Mile Creek) has been a concern too and is addressed in the Environmentally Sensitive Ordinance, Section 6.02.02.

St. Lucie County completed a number of drainage and storm-water improvement projects. These projects include retrofits at Paradise Park, South 7th Street, Harmony Heights, Rouse Road, and Indian River Estates. The County also has acquired several properties associated with the White City drainage program.

The Florida Department of Health in St. Lucie County participates several hazard related programs, including annual nuclear accident and hurricane drills. The Department has participated in Operation Vaccinate Florida, led the formation of the St. Lucie Medical Reserve Corps, and conducts numerous trainings for pandemic, biological and chemical response for epidemiology, environmental and community health preparedness and response.

3.6 MUNICIPALITIES

There are three incorporated municipalities within St. Lucie County. These are the City of Fort Pierce, the Town of St. Lucie Village, and the City of Port St. Lucie. Fort Pierce is the County Seat. All municipalities are chartered by the State of Florida and their forms of municipal government include Council-Manager, Council-Mayor, and Mayor-Commission. Each municipality is internally organized in the form of departments, divisions, and bureaus for the delivery of normal municipal services as determined by the local representative government.

3.6.1 Listing of Agencies

The organizational structure of each municipality in the County differs in terms of organizational complexity and functional responsibility. The cities of Port St. Lucie and Fort Pierce, due to greater population and geographic size, have organizational structures considerably more complex than St. Lucie Village.

The following is a brief discussion of typical agencies within municipal organizational structures having hazard mitigation functional responsibilities.

Emergency Management: The City of Port St. Lucie has its own Emergency Operations Center directed by an Emergency Management Coordinator. In Fort Pierce, a staff officer within the Police Department is charged with the responsibility. Both jurisdictions have established Emergency Management Committees comprising key departments and have emergency operations plans.

In the Town of St. Lucie Village, emergency management is handled more informally, given a population of 590. The municipality operates without full-time emergency management staff. It is important that the Village have an emergency operations plan in place, in order to be able to respond effectively during a disaster. The Village depends, to a large extent, upon County Division of Emergency Management.

Planning: The cities of Port St. Lucie and Fort Pierce have planning departments with professional staffs. The departments review zoning petitions, site plans, and other development orders (e.g., variances, special exceptions), and administer their local comprehensive plan. Planning in the Village is accomplished primarily by the Village Board of Aldermen. From time to time, they utilize consultants for planning services.

Building Departments: All the municipalities issue their own building permits. All operate under the Standard Building Code. Modifications are made to the various sections (e.g., building, plumbing, fire) of the Code from time to time; however, municipalities may or may not amend their local building code to reflect those changes.

Public Works/Engineering Departments: Port St. Lucie Public Works and Fort Pierce's Engineering Department have the responsibility for engineering and design, implementing structural improvements (e.g., stormwater facility retrofit, shuttering buildings, new construction), and maintaining the facilities. St. Lucie Village initiates contracts for these services.

3.6.2 Municipal Mitigation Policies and Ordinances

Municipal Comprehensive Plans: Like the County, the cities of Port St. Lucie and Fort Pierce have adopted Comprehensive Plans. They serve as policy instruments for each city, and define city development and redevelopment activities. All plans contain required plan elements: Conservation, Coastal Management, Infrastructure (i.e., potable water, sanitary sewer, stormwater management, solid waste, and natural aquifer recharge), Future Land Use, Housing, Recreation and Open Space, Transportation, Intergovernmental Coordination, and Capital Improvement. Six of the nine plan elements address hazards. **Table 3.5** summarizes, in a matrix format by jurisdiction, type of hazards by plan element.

Each municipal comprehensive plan has been reviewed. Specific mitigation related objectives and policies have been identified and have been described and cross-referenced in Table 3.5.

Regardless of municipality, most hazard-related issues are addressed in four plan elements of the Comprehensive Plan: Conservation, Future Land Use, Infrastructure, and Coastal Management. Any proposed capital projects identified in the plan elements also are identified in the Capital Improvement Element (CIE), the financial management component of the Comprehensive Plan. As recommended in Section 163.3177(3)(a), CIEs should be reviewed and updated annually. In practice, St. Lucie County updates its CIE at the time they are statutorily required to prepare Evaluation and Appraisal Reports.

Table 3.5: Comprehensive Plan Elements Hazards Summary

Comprehensive Plan Elements	St. Lucie County	Municipalities		
		Fort Pierce	Port St. Lucie	St. Lucie Village
Conservation	D,E,F,HZ,NT,W	D,E,HZ,W	D,E,F,H,NT,P,W	D,E,F,HZ,W
Coastal Management	E,F,H,HZ,NT,P	D,E,F,H,HZ,P	D,E,F,H,NT,P,W	E,F,H,NT,P
Infrastructure	D,F,HZ,W	D,F,HZ,P,W	D,F,FI,H,HZ,W	D,F,NT,W
Future Land Use	F,H,W	F,H,W	E,F,NT,W	F,H,NT,W
Housing				
Recreation and Open Spaces				
Transportation				
Intergovernmental Coordination				
Capital Improvement	E,F,H	E,F,H	NT	E,F,H
Ports, Aviation, and Associated Facilities				
Utilities				
Health and Human Services				
Public Education				
Fire Rescue				
Economic				
Library				
Historical Preservation				

Building Codes

City of Fort Pierce: The City updated its building codes with regard to wind, water, and fire in December of 2001. The City building code requires structures east of U.S. Highway 1 to be built to a wind load requirement of 140 mph and structures west of U.S. Highway 1 to be built to 130 mph.

Port St. Lucie: The City's building code requires structures east of the North Fork of the St. Lucie River to withstand 140-mph wind loads and requires structures west of the river to withstand 130-mph wind loads.

St. Lucie Village: The Village has adopted by ordinance the Standard Building Code and all amendments. New construction east of U.S. Highway 1 in the Village must be built to meet the wind load requirement of 140 mph. In addition, hurricane clips and gable bracing also are required.

Other Ordinances

City of Fort Pierce: In addition to its building code, the City has several other ordinances that regulate development within the City. They include its Flood Hazard Prevention Ordinance, which regulates the elevation of structures in the CHHA; and filling, grading and dredging, and placement of manufactured housing. The City's utility code contains provisions that regulate the use of water during periods of drought.

The City also entered into an inter-local agreement with the County in 1998, which addresses local and regional emergency response capability for containing and cleaning up hazardous materials and waste accidents occurring in area waterways. Based on the agreement, the City has agreed to store oil spill cleanup equipment.

The City established a landscape and tree ordinance in 2002 that addresses hurricanes, tornadoes, and agricultural pests and diseases.

The City has addressed roads and evacuation routes with chronic flooding in the City Strategic Emergency Management Plan. The City Strategic Management Plan's Landscape and tree ordinance addresses the susceptibility of Australian Pine to heavy rain and wind events. The maintenance of drainage basins, redevelopment in hazard prone areas, and utility function on the barrier island are addressed in the City Comprehensive Plan. Utilities are addressed again along with critical facilities in the City Strategy Management Plan.

City of Port St. Lucie: The City has a number of ordinances other than the building code that address various hazard events and include flood damage prevention and drainage ordinance, wellfield protection, stormwater utility rules, and burn ordinances. The City also has two unique disaster-related ordinances: emergency purchasing procedures, and an expedited permitting process following a major disaster.

Town of St. Lucie Village: For the past 20 years, the Village has had a flood damage prevention ordinance, which is administered by the St. Lucie Village Board of Aldermen.

3.7 COMMUNITY ORGANIZATIONS

St. Lucie has a wide range of Community organizations and include faith-based, Chambers of Commerce, the local historical society and youth organizations. These groups represent diverse interests present within the community and provide vital services as well. Many services provided by St. Lucie County's community organizations can help to achieve the goals of hazard mitigation identified in this mitigation strategy. The following lists provide information on services provided by organizations that work within St. Lucie County to reduce the risks posed by disasters.

3.7.1 University of Florida/St. Lucie County Cooperative Extension: The St. Lucie County Cooperative Extension actively promotes hazard mitigation in St. Lucie County through more than a dozen programs.

3.7.2 Fort Pierce Utilities Authority (FPUA): The FPUA has replaced 8 miles of vulnerable water mains located on South AIA on the barrier island. FPUA also has been engaged in the following activities:

- FPUA Storm Manual
- Comprehensive Vulnerability Assessment of Water Systems for the FPUA
- Hurricane Awareness educational outreach in customer bills

3.7.3 Florida Power & Light Co. (FPL)

Each year, FPL produces a booklet on the emergency plan for the St. Lucie Nuclear Power Plant on Hutchinson Island. The booklet includes evacuation maps and information for residents in St. Lucie and Martin counties. The company mails the booklet to households who would be affected by a plant emergency.

3.7.4 Red Cross – Coast to Heartland Chapter

The Red Cross (RC) Treasure Coast Chapter is active in providing mitigation programs and activities within the community. The RC provides education and preparedness information in the community for a variety of emergencies. The RC sponsors a senior home safety project where groups of. The RC provides community support after localized emergencies or large- scale disasters. The RC provides shelter services at a variety of locations in the County and provides logistical assistance to responders on emergencies.

3.7.5 United Way of St. Lucie County

The United Way of St. Lucie County has developed and implemented volunteer reception center. Following disasters, the County can open volunteer reception centers where volunteers are registered

3.8 INTERGOVERNMENTAL COORDINATION

An essential element of the hazard mitigation process is intergovernmental coordination. Disasters often impact areas that cross jurisdictional boundaries; inter-governmental coordination and collaboration that includes service providers will strengthen communities against the loss of life and property. Mutual Aid between counties north and south of St. Lucie County is a common occurrence with law enforcement and fire rescue agencies that may respond to criminal activity, transportation related accidents, evacuation planning and investigations as well as fire, mass casualty hazardous materials releases.

Coordination is important not only horizontally, from department to department, at the local level between County, municipalities, non-profit organizations, and the private sector, but also vertical levels of State and federal governmental departments and agencies.

Besides the Unified Local Mitigation Strategy (LMS) initiative, there are several other entities that serve as beneficial coordination mechanisms that already exist. They are briefly described below.

3.8.1 Transportation Planning Organization (TPO)

The St. Lucie County Transportation Planning Organization (TPO) coordinates local, State, and federal funding for roadway improvements. The policy board is comprised of elected officials from the County and the municipalities. Two key policy documents of the TPO are the Long-Range Transportation Plan (LRTP), and the 5-year Transportation Improvement Plan (TIP). The TIP identifies and schedules all future roadway improvements in the near-term. These two plans allow for opportunities to plan potential projects to occur while other construction is already taking place, saving time and associated costs and may also allow for linking more than one mitigation project to be undertaken to solve larger area problems – for instance drainage or flooding issues that affect several areas.

3.8.2 Local Government Comprehensive Plans

One mechanism to achieve intergovernmental coordination is the local comprehensive plan. As described above, each comprehensive plan contains an intergovernmental coordination plan element. In St. Lucie County, there are several instances in which local governments are dependent upon another contract with private or quasi-governmental entities to provide services. Examples include the Fort Pierce Utilities Authority providing water and sewer to the City of Fort Pierce; and County and municipality government contract agreements with the St. Lucie County Fire District for fire, hazardous materials protection and response and emergency medical services. The Comprehensive Plan can be utilized to engage other service providers to encourage mitigation activities and/or create partnerships in preparedness and recovery actions.

3.8.3 St. Lucie County Comprehensive Emergency Plan (CEMP)

The CEMP must be integrated into and coordinated with all other County emergency management plans such as the Continuity of Operations Plan (COOP), the Post-Disaster Redevelopment Plan (PDRP), Shelter Plan and Housing Plan. Further, the CEMP should be integrated with the State plans and programs utilizing and in concert with federal government plans and directives. The CEMP is an operational plan and addresses local and regional evacuation, public shelter, post-disaster response and recovery, rapid deployment of resources, communications and warning systems, training exercises.

The plan also defines roles and responsibilities of all partner organizations. These responsibilities are clearly defined as 17 ESFs (**Table 3.3**; see page 56). Each ESF is headed by a lead agency, which has been selected based on its authorities, resources, and capabilities in the functional area. The ESFs also serve as the primary mechanism through which outside assistance to St. Lucie County is coordinated.

3.8.4 Treasure Coast Local Emergency Planning Committee (TCLEPC)

The LEPC is an important vehicle to coordinate administration of regional compliance with hazardous materials, chemical inventories reporting, chemical release preparedness planning and responder training State and federal laws and best practices. The TCRPC provides staff as the LEPC Coordinator to administer the activities of the LEPC and implement the Emergency Community Right-To-Know Act (EPCRA).

3.8.5 State Comprehensive Emergency Management Plan (SEMP)

The State of Florida CEMP establishes the framework for a coordination system to ensure that the State of Florida will be prepared to respond to emergencies and disasters. The plan describes roles and responsibilities of State agencies, special districts, local governments, and voluntary organizations. The CEMP unites the efforts of these groups for a comprehensive approach. The plan is divided into three sections described below.

- *The Basic Plan:* Outlines how the State will assist counties in response, recovery, and mitigation of disasters; details responsibility at various levels of government; describes method of operations and financial management policies; ensures continuity of government; and addresses recovery issues.
- *Specific Response/Recovery Actions:* These actions are unique to a specific hazard and take the place of the Basic Plan and Response Functions sections.
- *Response Functional Annexes:* Presents the State's strategy for disaster response by outlining ESF. ESFs are structured from the Federal Response Plan.

3.8.6 St. Lucie County School District

The St. Lucie County School District has 51 schools, 17 Elementary Schools, 4 middle schools, 6 high schools and 12 K-8 schools. There are 2 Non-traditional (digital and online), 4 Magnet Schools and 5 Charter schools and one 6th grade through 12th grade school. Within the District, all schools can be utilized as risk shelters. Due to proximity to the St. Lucie Nuclear Power Plant, all School District schools are located in the Emergency Planning Zone (EPZ) for evacuation.

Post-disaster recovery plans include recommendations for hazard mitigation options including, but not limited to shuttering, hardening and enhanced strengthening of rooms or areas within buildings such as gyms or cafeterias, reconstruction, or demolition of damaged public facilities. The District is insured through a third party administrator with a consortium to include seven (7) other Florida school districts.

3.8.7 Municipal Mitigation Projects/Initiatives

City of Fort Pierce

The City has undertaken a number of Flood mitigation projects. Many have been constructed to eliminate home, yard, and street flooding. 95% of the projects identified in the stormwater master plan have been completed.

Other mitigation efforts involve the City participating in exercises with the County Division of Emergency Management and participation in the FDEM and County annual hurricane exercise. Internally, City staffs have developed a Disaster Recovery Plan based on the ESF structure, which focuses primarily on flooding and hurricane evacuation.

The City has an all-hazards approach Emergency Management Plan which includes procedures for response to disasters that include: floods, hurricanes, tornadoes, radiological and terrorism incidents, and wildland fire incidents. In 2003, FEMA FIRM maps were integrated into the City's geographic information system (GIS) system.

All essential staff for the City of Fort Pierce have received FDEM-provided COOP (Continuity of Operations Plan) initial training, and the City is pursuing implementation of a COOP. All essential staff for the City of Fort Pierce have received training in Basic Incident Command System training prior to the 2010 update of this LMS. The City's EOC Standard Operating Procedures and Emergency Management Plan follow the Department of Homeland Security, Incident Command System (ICS) structure.

Mitigation Strategies for the City are:

- Provide free residential yard waste and tree trimming collection for Hurricane Season; Maintain city trees year round with bucket truck and operator-
- Continue implementation of Storm-water Master Plan to reduce structure, street and yard flooding
- Participation in the Countywide mass notification system
- Continued participation in planning and exercises with the County

Although not formalized as a hazard mitigation program, the City through various departments has implemented a number of mitigation-type projects. The following list represents projects completed since the last comprehensive update of this LMS in 2010. The City of Fort Pierce currently has active projects on the Prioritized Project List with some projects that are ongoing.

- Moore's Creek Retrofit - Phases I and II have been completed; however, additional phases remain to be completed.
- Moore's Creek Canal Basin – Replacement/upgrading of storm system and expansion of the canal to provide additional flooding protection by increasing conveyance capacity.
- Virginia Avenue Basin (Mayflower Canal & U.S. Highway 1 crossing) – Upgrade/replace culvert crossing of the Mayflower Canal and U.S. Highway 1 drainage. Storm Hardening a FPUA Water Pumping Facility.
- Replace doors on 184 low income homes at Lawnwood Terrace and Lawnwood Terrace Annex with wind load doors.
- Storm-water Master Plan – design and implement a city-wide storm-water master plan to address flooding concerns and plan for future projects.
- Avenue Q/12th Street Basin – Replaced and upgraded 12th Street outfall and other main conveyance system.
- Fort Pierce Public Works: Emergency Operation Center Renovation – Continued structural and contents upgrade to the City's Emergency Operation Center.
- Elevate pumps, AC units and control panels to avoid future damage to sewage disposal system from flooding caused by hurricanes or intense rain events; this measure will mitigate the interruption of sewage disposal.
- Elevate pump drives, AC unit, control panel and reinforce Air Scrubber Towers to avoid future damage from flooding and excessive wind caused by hurricanes or intense rain events; this measure will mitigate the interruption of sewage disposal.

- Fort Pierce Police Department Mobile Command Center – Acquired and equipped a mobile command center that can be moved to safety and ensure response team availability.
- In progress; Design and construct a community center at Avenue D & 29th for use as a shelter.
- The City completed the initiative to provide hurricane resistant windows on all Public Facilities.
- South Indian River Drive (Drainage Improvements) – Replace existing pipes with new pipes and catch basins.
- Ongoing Transfer of Public Records – Transfer of public records from paper to an optical disc.
- Improvements to the Fort Pierce Jetty along with re-nourishing South Beach have mitigated beach erosion however this is an ongoing activity dependent upon storms.
- Creation of the Emergency Management Committee. This group is composed of all key City departments. From February to October, the staff meets on a bi-weekly basis. Through the efforts of the Committee, the City now has an Emergency Management Operations Plan.

City of Port St. Lucie

The City has completed or is in the process of completing a number of capital projects that have been built with mitigation planning integrated into the project planning phase. Public structures recently completed, the Police Department and Community Center, both were built to withstand 140-mph wind loads. The Community Center also functions as a Special Needs Shelter. The City Hall underwent major expansion and retrofitted to withstand 140-mph winds and houses the Emergency Operations Center.

Other mitigation-type activities the City has accomplished in recent years;

- Instituted reverse 911 emergency notification system;
- The Purchasing Department has expanded and continually updates for currency. Also, in expansion of intergovernmental coordination, the City has joined the Statewide network of purchasing departments;
- Maintains an MOU with several local gas stations in the event the City gas pumps located at the Public Works Department fail to operate;
- The City Building Department officials notify all contractors operating within the City to secure building sites;
- The City has purchased a floodplain along the North Fork of the St. Lucie River;
- Conducts hurricane, and other hazard specific drills and exercises;
- Provides community outreach education on drainage activities for PSLTV 20;
- Ongoing emergency coordination meetings with St. Lucie County Division of Emergency Management; and
- Maintains hurricane preparedness public services announcements in preparation for Hurricane Isabel for PSLTV 20.
- Completed Eastern Watershed Improvement Project, a 4,000 acre stormwater conveyance, retention and treatment system to reduce flooding and improve water quality

Mitigation projects on the Prioritized Project List that have been completed since 2010 are listed below. Some projects are ongoing and new project applications will be brought to the Steering Committee in the coming year.

- City of Port St. Lucie Wildland Fire Mitigation Plan: Prepared a Wildland Fire Mitigation Plan as part of the Comprehensive Emergency Operations Plan.
- Acquired Radio Communication Equipment – Acquire (two hand-held and one base unit) radio communication equipment.

- Watershed “B” – Construct improvements to the E-8 Canal System and E-8 drainage basin to reduce flooding hazard.
- Watershed “A” – East – Installation of culverts, sluice gates, and retaining wall to connect the A-1 lake to A-7 lake in the Watershed “A” – East Drainage Basin.
- Developed a Post Disaster Redevelopment Plan (PDRP): participated in development of the St. Lucie County PDRP of which the City of Port St. Lucie is represented.

Town of St. Lucie Village

The Town of St. Lucie Village has completed an inventory of its drainage facilities. The next phase will be to identify problems and solutions. However, the Village is not waiting until the study is complete before curing some of its drainage problems. The Town has initiated ditch clearing and yard drainage improvements and carries out regularly scheduled maintenance of its storm-water drainage system with assistance from the County. The Village filed for and received approval of funds to purchase a 76.55-acre tract of land bordering the Indian River Lagoon. The site has both natural resource and historical significance. Because the site borders the Indian River Lagoon, shoreline protection and preservation of a resource that mitigates damage from coastal storms and hurricanes are additional benefits of the purchase.

Mitigation Strategies for the Town are:

- Continued public outreach in disaster preparedness covering all hazards the Town is vulnerable to.
- Participation in the planning and exercises with St. Lucie County.

St. Lucie County School District

All schools and buildings constructed post-2000 have been designed to meet wind storm requirements at the time of construction. When replacing a specific school or building the District has constructed those schools outside flood prone areas or has placed replacement schools or buildings above flood stage levels. Other mitigation efforts involve the District participating in drills and exercises with County Division of Emergency Management and Emergency Support Functions (ESFs). Internally, District staff has developed a Disaster Recovery Plan based on the ESF structure, which focuses primarily on hurricane shelter and evacuation matters. The District also has an all-hazard Crisis Plan. This plan will include procedures for response to all hazardous conditions, and includes flooding, hurricanes, tornadoes, radiological incidents, active shooter and terrorism incidents. All essential staff in the District have received NIMS training in Basic Incident Command Systems (ICS), awareness and intermediate levels.

In the past and recently, the District has installed shutters on schools and support facilities, emergency shelters to mitigate storm damage to the schools and protect occupants being used as shelters during an emergency. Additionally, newer schools have been designed to meet EHPA requirements to ensure proper levels of shelter capability for County and regional residents. The District continues to include mitigation strategies to all buildings and property when building, renovating or relocating facilities on District property.

Mitigation Strategies for the School District:

- Hardening of facilities interior and exterior;
- Procure generators for backup power systems;

- Continued education in disaster preparedness; and
- Continued participation with County Emergency Management in planning, preparedness, exercises, and mitigation efforts.

3.9 STRENGTHENING THE ROLE OF LOCAL GOVERNMENT

As has been described in the text, local governments in St. Lucie County have taken steps to strengthen themselves both in terms of capital facility improvements and ordinances, regulations, and programs. There are a number of activities that the County and municipalities can undertake to strengthen the role of local governments and to lessen the impacts resulting from emergency events that do not require expending money on capital projects. Plans can be modified, laws and regulations can be amended, informational materials can be published and distributed, and professional training can be augmented. Ideas were generated from a variety of sources: interviews with local jurisdictions, and information generated from LMS datasheets, the LMS Steering Committee, and discussions with local governments. The suggestions resulting from the various discussions with local government include:

The suggestions resulting from the various discussions with local government include:

- 1) LMS PPL should be incorporated into local government Capital Improvement Elements (CIEs) located in comprehensive plans at the time the CIEs are reviewed on an annual basis in accordance with Section 163.3177(3)(a), F.S.;
- 2) As permitted under Section 163.3177(7)(h)&(l), F.S., local governments could incorporate an optional comprehensive plan element for public safety, hazard mitigation and post-disaster redevelopment planning;
- 3) Integrating the LMS into the St. Lucie County CEMP;
- 4) Making all communities CRS eligible (St. Lucie Village is a participant of the NFIP program, but not of the CRS program);
- 5) Assessing existing CRS programs to determine ways to strengthen and improve the local jurisdiction's CRS rating;
- 6) Requesting technical assistance from the Treasure Coast Regional Planning Council to improve and implement the education and outreach of the LMS and CRS programs;
- 7) Hazard mitigation retrofit program development;
- 8) Monitoring the outcome of the Florida Building Commission, ongoing evaluation of existing building codes, identify deficiencies, and recommend desired changes to strengthen the existing building codes;
- 9) The designing and bidding of all public building construction, whether it be new construction or renovation of older public structures, should incorporate hazard mitigation building practices, whenever financially feasible;
- 10) Require all mobile home parks to retrofit a community space engineered to withstand Category 3 hurricane wind loads and an F2 tornado. An adequate warning system needs to be incorporated into the retrofit. Such a structure would then provide the mobile home park residents a "safe haven refuge. Once constructed, the mobile home park administration should conduct drills to familiarize the residents with procedure;
- 11) Implementing a "safe room" requirement in the local building codes that addresses, not only new construction, but renovation as well;
- 12) Develop a wildland fire mitigation program in coordination with the FFS;

- 13) Getting year-round coverage in the local media to get the message out to people, not only that it is important to be prepared, but also to sell the idea the hazard mitigation saves dollars in the end;
- 14) Working with the private sector to develop procedures that ensure coordination between the County and business community, before, during, and after a disaster event;
- 15) Develop education and outreach materials and workshops to network and communicate with private business and industry on mitigation opportunities to build more efficient recovery strategies;
- 16) Enhance communication and coordination among the County and municipalities to increase capacity to implement mitigation activities;
- 17) Complete and present annual reports on the status of the LMS program to all local elected bodies;
- 18) Integrate hazard mitigation concepts into the development review process at the County and municipal levels; and
- 19) Evaluate the vulnerability of all critical facilities in the County and municipalities.

3.10 PRIVATE SECTOR BACKGROUND AND ANALYSIS

Hurricanes Frances, Jeanne, and Wilma in 2004 and 2005, Tropical Storm Fay in 2008, and Tropical Storm Isaac in 2012, can cause massive disruptions in the local economy. Mitigation in the business community has become more prevalent with large firms like Florida Power & Light (FP&L), AT&T, Walmart, and Winn-Dixie and Publix, as well as, the banking community preparing contingency plans and continuity of operations plans. Florida Power and Light has hardened assets like transmission lines by burying lines to mitigate wind impacts. Many businesses have installed generators to ensure operations and provision of services after storms. Smaller businesses are aware of hazard mitigation and disaster preparedness benefits and have taken advantage of Small Business Administration resources and tools to develop preparedness plans. However, small businesses have few options available to protect assets and insurance remains the most used resource..

As part of the LMS effort, the St. Lucie County Division of Emergency Management is developing an ESF #18 – Business and Industry and intends to organize an ad hoc Private Sector Subcommittee. Initial tasks include identifying key community businesses that represent the vast majority of firms comprising the St. Lucie County business community, initiate a workshop for education on preparedness and recovery, and compile outreach materials for businesses that encompass a wide range of mitigation activities.

Stakeholders for the ESF and the Private Sector Committee include: the St. Lucie County Business Development Board, local chambers of commerce, St. Lucie County Economic Council, and the Treasure Coast Builders Association. In addition, important non-profit organizations were identified that historically have been involved locally in disaster-related activities (i.e., Red Cross, Salvation Army, and Council on the Aging). Finally, key private sector firms that have played important roles in the development of the Post-Disaster Recovery Plan for the County such as FP&L, AT&T, The Home Depot, and Publix and Walmart.

There are a number of activities in which the private sector can become involved in LMS; however, the first and foremost obstacle has been energizing the interest of businesses to become involved in the process. Businesses clearly understand that it is in their interest to develop a hazard mitigation plan prior to an actual event occurring.

These organizations need to become the core private sector group that spreads the word about the importance of "being prepared", taking steps and creating a plan before the disaster occurs. The private sector body could encourage proactive mitigation by developing materials raising awareness and educating businesses of the need to be prepared for disaster impacts.

Expanding roles and responsibilities of private sector businesses in disaster events beyond just cleaning up the mess and getting back to normal business will build resiliency and sustainability in the wake of a disaster leading to faster recovery and less costs to do so. Implementing mitigation projects requires educating businesses of the importance of hazard mitigation planning. Besides awareness and education, other roles that businesses can assume to strengthen private sector involvement in the LMS include business contingency planning, participation in the new ESF #18, and participation in County disaster exercises to ensure resilience after a disaster or event.

SECTION 4.0

HAZARD IDENTIFICATION, VULNERABILITY, AND RISK

Section 4.0 Updates

- Section 4.0: (Hazard Identification, Vulnerability and Risk):_updated and Tsunami and Sea Level Rise to the Natural Hazards list.
- Table 4.1: (Identification and projected impact potential for St. Lucie County Hazards): Added tsunami as a hazard category, the historical events section was updated.
- Section 4.1.1: Flooding - Subsection 4.1.1.1: added sentence on soil saturation, Coastal High Hazard Area and Sea Level Rise reference added.
- Table 4.2: (Average monthly Rain Totals), updated to current average.
- Table 4.3: (Recent Floods Impacting St. Lucie County), added Tropical Storm Isaac and 01/09/14 event.
- Table 4.4: (Vulnerability to Flooding), updated table and added source.
- Table 4.12: (Vulnerability to Wind Damage in Hurricanes), updated Table.
- Figure 4.2: (Flood Prone Map), updated map.
- Figure 4.3: (Maps of Repetitive Loss Properties in St. Lucie County), updated map..
- Figure 4.4: (Maps of Flood Prone Streets in St. Lucie County), updated map.
- Figure 4.5: (Storm Surge Maps for St. Lucie County) updated map.
- Figure 4.6: (Hurricane Evacuation Zone Maps for St. Lucie County), updated map.
- Table 4.12: (Vulnerability to Wind Damage in Hurricanes), updated table.
- Table 4.13: (Debris Probability Based on a 10-year Storm Event), Updated table.
- Table 4.14: (Number of Tropical Depressions, Tropical Storms, and Hurricanes for past 5 years), added Hurricanes Isaac and Sandy
- Table 4.15: (St. Lucie County Recent Tropical Storm and Hurricane History),
- Table 4.16: (Vulnerability to Storm Surge) updated table.
- Table 4.17 (Vulnerability to Wind Damage in Hurricanes), updated table.
- Table 4.18 (Damage, Sheltering Requirements, and Economic Loss to St. Lucie County). added table and source.
- Section 4.1.3.1 (Tornado) Updated number of tornado, injuries and deaths, number of RV park spaces and mobile home spaces
- Table 4.20: (Recent History of Tornadoes in St. Lucie County), updated table.
- Section 4.1.4 Severe Thunderstorms Updated historic events, damage totals
- Section 4.1.4.4 Risk Assessment, added lightning strike probability and source
- Section 4.15 (Wildland Fire) Updated all tables and photos, added current data
- Table 4.23: (Historic Lightning incidents causing death, injury or damage), added table
- Table 4.24: (Recent Significant Wildfires in St. Lucie County), added table.
- Table 4.25: (Saint Lucie County's Five Year Wildfire History), added table.
- Figure 4.7: (St. Lucie County Wildfires 2011-2015), added map.
- Table 4.26: (Saint Lucie County's Five Year Wildfire Causes 2011-2015), added table.
- Figure 4.8: (St. Lucie County WUI Risk Index Map), added map.
- Table 4.27: (St. Lucie County WUI Risk Index – Acres), added table.

- Table 4.30: (Analysis of Vulnerability to Sea Level Rise of 2 feet), added table.
- Table 4.31: (Analysis of Vulnerability to Roadways from Sea Level Rise of 2 feet), added table.
- Table 4.32: (Analysis of Vulnerability to Critical facilities from Sea Level Rise of 2 feet) added table.
- Section 4.1.6 (Erosion) Updated Re-nourishment projects, historic data and source
- Figure 4.10: (Map of St. Lucie County Critically Eroded Beaches), updated map.
- 4.2.1 (Extreme Temperatures) Subsection 4.2.1.2 updated crop damage potential
- Figure 4.11: (Sinkhole Occurrences in Florida), added map.
- Figure 4.12: (Sink Hole Areas in Florida), added map).
- Section 4.2.4: Tsunami, added entire Hazard and data
- Section 4.2.5: Sea Level Rise, added entire Hazard and data
- Section 4.2.6: Dam & Levee Failure, added preliminary information reference 10 mile creek

The purpose of this section is to describe the hazards facing St. Lucie County in terms of potential vulnerability impacts, and loss. Hazards faced in St. Lucie County fit into three general classifications: natural, technological, and societal. Natural hazards include floods, hurricanes/tropical storms, tornadoes, severe thunderstorms, lightning, wild land fires, muck fires, extreme temperatures, soil/beach erosion, drought, seismic hazards, agricultural pests and diseases, and epidemics. Natural hazards can affect a part of the county or the whole of the county unless otherwise detailed in the following profiles. Technological hazards include radiological accidents, power failure, hazardous materials accidents, transportation system accidents, well field contaminations, and communication failures. Societal hazards include terrorism (physical and cyber) and sabotage, civil disturbances, and immigration crises.

The Hazard Identification section describes each hazard above and provides historical data on impacts where available. Maps are provided to illustrate the location and extent of hazards. Disasters are classified by the magnitude of their effects.

The vulnerability assessment for each hazard describes the community assets and potential impacts for each hazard. A community's vulnerability depends on the extent of the hazard exposure and the value of potentially vulnerable assets. Higher risk areas with higher potential damage warrant mitigation practices that are more extensive. Communities in this situation may rely on land use and site design rather than on relatively simple measures such as building codes and hardening existing structures. Other factors that influence vulnerability and are important for communities to consider when selecting mitigation practices are pre-disaster mitigation, the amount of undeveloped and underdeveloped land, and in the case of post-disaster mitigation, the amount of developed land within the community. For the purposes of the LMS, vulnerability is classified as individual, social, and biophysical. Individual vulnerability describes the susceptibility of a person or a structure to potential harm from hazards. Social vulnerability describes demographic characteristics of social groups that make them more or less susceptible to the adverse impacts of hazards. Biophysical vulnerability examines the distribution of hazardous conditions arising from a variety of initiating events such as natural hazards, chemical contaminants, or industrial accidents (MDC, 2009).

Factors influencing vulnerability include, but are not necessarily limited to a community's geographic location, type of construction, demographics, and cultural characteristics. The general hazards to which St. Lucie County is vulnerable and the projected potential impacts across the community exposure and services are discussed below under the vulnerability subsections for each hazard.

The hazards identified and discussed here are organized based on the maximum projected impact potential (i.e., hazards capable of producing the maximum community-wide impact, such as hurricanes and floods, are discussed first). This does not mean other identified hazards are less important or less worthy of mitigation, only that their potential to affect the total community is lower.

In order to effectively plan hazard mitigation projects and allocate scarce financial resources, a community's vulnerability to a specific hazard must be coupled with other critical factors to perform a risk assessment.

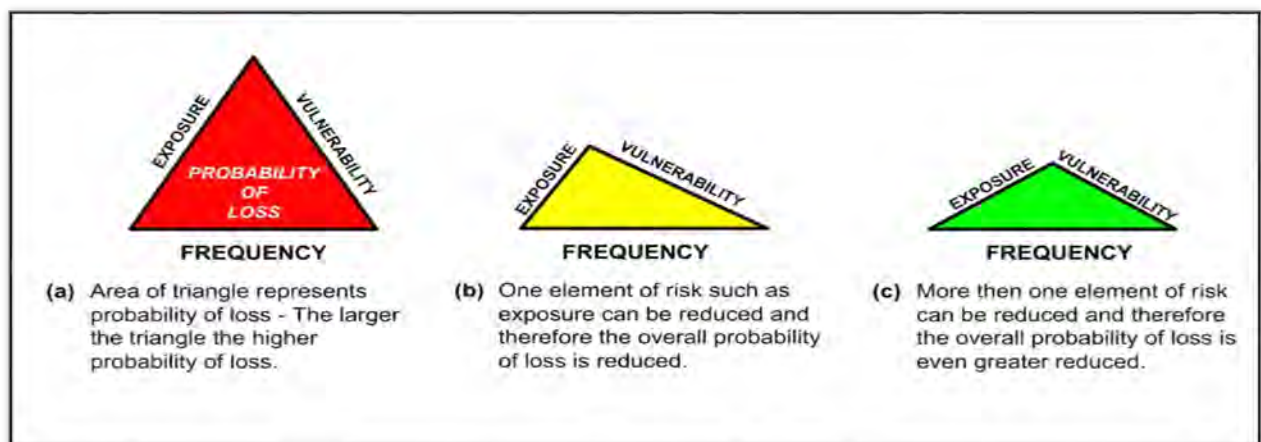
Risk, or the probability of loss, depends on three elements:

- Frequency - how frequently does a known hazard produce an impact within the community?
- Vulnerability - how vulnerable is a community to the impacts produced by a known hazard?,
- Exposure - what is the community's exposure in terms of life and property to the impacts produced by a specific hazard?

Once these three factors are established, the risk level faced by a community with regard to any specific hazard can be calculated using the "Risk Triangle" approach.⁹

In this approach, these three factors become the sides of a triangle, and the risk or probability of loss is represented by the triangle's area depicted below in **Figure 4.1**. The larger the triangle, the higher the community's risk with respect to a given hazard. If a community reduces any of these three factors, they reduce their risk or potential for loss.

Figure 4.1 – Risk Triangle



Source: *The Risk Triangle*; David Crichton 1999

In St. Lucie County, the overall exposure to tropical storms, hurricanes, floods and earthquakes was determined by a risk assessment model software application called HAZUS-MH developed by FEMA. HAZUS-MH is a nationally applicable standardized methodology that contains models for estimating potential losses from the above hazards. HAZUS-MH uses Geographic Information Systems (GIS) technology to estimate physical, economic and social impacts of disasters. It graphically illustrates the limits of identified high-risk locations due to earthquake, hurricane and

⁹ Crichton, 1999

floods. HAZUS-MH is used for mitigation and recovery, as well as preparedness and response. Government planners, GIS specialists and emergency managers use HAZUS-MH to determine losses and the most beneficial mitigation approaches to take to minimize them. HAZUS-MH can be used in the assessment step in the mitigation planning process, which is the foundation for a community's long-term strategy to reduce disaster losses and break the cycle of disaster damage, reconstruction and repeated damage. In terms of natural hazards, there is very little if anything that can be done to change the frequency with which they produce impacts in a community. Mitigation planning relative to those hazards must therefore focus on reducing the community's vulnerability or exposure. In terms of technological and societal hazards, the most cost-effective type of mitigation is to limit or reduce the frequency with which such hazards actually occur.

The St. Lucie County LMS has profiled all potential natural and manmade Hazards including those with even the remotest probability of impacting St. Lucie County. The Steering Committee has no identified mitigation strategies for Drought and Tsunamis, therefore they are included in the Strategy as information only. The list of profiled hazards for St. Lucie County are contained in **Table 4.1** on the next page.

**Table 4.1 Preliminary Identification and Projected Impact Potential for
St. Lucie County Hazards**

Hazard Category	Projected Impact Potential (structures, infrastructure, people, environment, etc.)																			
	Excessive wind	Excessive water	Damaging hail	Soil/beach erosion	Electric power outage	Surface and air transportation	Navigable waterway impairment	Potable water system loss or	Sewer system outage	Telecommunications system outage	Human health and safety	Psychological hardship	Economic disruption	Disruption of community services	Agricultural/fisheries damages	Damage to critical environmental	Damage to identified historical	Fire	Toxic releases	Stormwater drainage impairment
Natural Hazards																				
Flooding		X		X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X
Hurricanes/Tropical Storms	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Tornadoes	X				X	X				X	X	X	X							
Severe Thunderstorms & Lightning	X	X	X		X	X				X	X	X	X					X		X
Wildland Fire					X	X				X	X	X	X	X	X	X		X	X	
Erosion		X		X			X						X			X				X
Extreme Temperatures					X						X	X			X	X				
Drought													X		X	X		X		
Geologic Hazards						X													X	
Tsunami		X		X		X	X				X		X			X				X
Sea Level Rise				X													X			
Dam/Levee Failure		X				X	X				X		X		X					X
Agricultural Pests and Disease											X	X	X		X	X				
Epidemics											X	X	X	X						
Radiological Accidents					X	X				X	X	X	X	X		X			X	
Power Failures					X	X		X	X	X	X	X	X	X						
Hazardous Materials Accidents						X					X	X	X	X				X	X	
Transportation System						X	X				X		X	X				X		
Wellfield Contaminations								X	X		X	X	X	X						
Communications Failures										X	X		X	X						
Terrorism and Sabotage					X	X		X		X	X	X	X			X	X	X	X	
Civil Disturbances						X					X	X	X	X			X			
Immigration Crises											X	X	X	X						

Source: St. Lucie County LMS Steering Committee

4.1 NATURAL HAZARDS

St. Lucie County is susceptible to a number of natural hazards with the potential to cause extensive damage within the community. The cost of responding to and recovering from these disasters has proven to be significant. Planning for these events before they occur can significantly reduce costs in the future. Hurricanes, tropical storms and wind related disasters were responsible for the most property damaged during this time period. This subsection will now identify those hazards in St. Lucie County identified as being naturally occurring.

4.1.1 Flooding

4.1.1.1 Hazard Identification

A Flood is defined by the National Weather Service as any high flow, overflow, or inundation by water, which causes or threatens damage. There are a number of Flood types, such as:

River Flood – Occurs when water levels rise over the top of river banks due to excessive rain from tropical systems making landfall, persistent thunderstorms over the same area for extended periods of time, combined rainfall and snowmelt, or an ice jam.

Coastal Flood – The inundation of land areas along the coast caused by higher than average high tide and worsened by heavy rainfall and onshore winds (i.e., wind blowing landward from the ocean).

Storm Surge – An abnormal rise in water level in coastal areas, over and above the regular astronomical tide, caused by forces generated from a severe storm's wind, waves, and low atmospheric pressure. Storm surge is extremely dangerous, because it is capable of flooding large coastal areas.

Inland Flooding – Occurs when moderate precipitation accumulates over several days, intense precipitation falls over a short period, or a river overflows because of an ice or debris jam, or dam or levee failure.

Flash Flood – Caused by heavy or excessive rainfall in a short period of time, generally less than six hours. Flash floods are usually characterized by raging torrents after heavy rains that rip through river beds, urban streets, or mountain canyons sweeping everything before them.

In St. Lucie County, several variations of flood hazards occur due to the different effects of severe thunderstorms, hurricanes, tropical storms and seasonal rains. For the majority land area of the County, the primary causes of flooding are hurricanes or tropical storms and thunderstorms. However, the County's low-lying topography, combined with the subtropical climate, make it vulnerable to riverine and estuarine associated flooding. Flooding in St. Lucie County results from one or a combination of both of the following meteorological events:

Flooding in St. Lucie County results from one or a combination of both of the following meteorological events:

- 1) Tidal surge associated with northeasters, hurricanes, and tropical storms; and
- 2) Overflow from streams and swamps associated with rain runoff.

When intense rainfall events occur, streams and drainage ditches tend to reach peak Flood flow concurrently with tidal water conditions associated with coastal storm surge. This greatly increases the probability of flooding in the low-lying areas known as the Coastal High Hazard Area (CHHA), and the Category 1 Storm Surge. These low lying areas will be further aggravated with higher water levels by Sea Level Rise.

Areas along the North and South Forks of the Indian River lagoon/estuary are particularly susceptible to flooding under these conditions. The most Flood prone areas in the eastern portion of the County feature poorly drained soils, a high water table, and relatively flat terrain, all of which contribute to their flooding problems. Flat terrain and heavily wooded areas aggravate Flood problems by preventing rapid drainage in some areas.

Riverine flooding occurs when the flow of rainwater runoff exceeds the carrying capacities of the natural drainage systems. During extended periods of heavy rainfall, certain low-lying neighborhoods within the County are subject to considerable flood damage and isolation caused by the inability of natural and mechanical drainage systems to effectively remove the water. Heavy rainfalls can cause considerable damage to County infrastructure including roadbeds, bridges, drainage systems, and the water supply. The buildup of uncontrolled sediment contributes to the problem of inadequate drainage in natural and mechanical drainage systems. When a storm produces an overwhelming amount of storm water runoff, the accumulation of loose sediment materials (sand and soil) clogging the drainage systems causes backing up of water and thereby increased flooding. Soil saturation is also compounded as water sits in backed up areas.

In comparison to riverine flooding, coastal flooding is usually the result of a severe weather system such as a tropical storm or hurricane. The damaging effects of coastal floods are caused by a combination of storm surge, wind, rain, erosion, and battering by debris. All coastal property and inhabitants are subject to severe damage and loss of life resulting from floods caused by hurricane-associated storm surge. Some coastal property, road arteries, and bridge approaches are subject to severe flooding caused by rare astronomical tides as well.

Frequencies from flooding associated with rain events other than tropical storms and hurricanes are more difficult to estimate. Eastern Florida shows an annual dry cycle stretching from early November through mid-May. During this part of the year, monthly rainfall rarely exceeds 3.5 to 4.0 inches per month. The wet season, beginning mid-May and running through October, shows monthly rainfall levels in the area to be between 6.0 and 8.5 inches. The heaviest rainfall usually occurs in June and September. In St. Lucie County, the eastern or coastal section of the County receives more rain than the western section. This rainfall pattern coupled with the hurricane season (June through November) makes St. Lucie County particularly vulnerable to flooding associated with tropical storms and hurricanes because they typically occur when the water table is high and the ground is saturated.

Table 4.2 Average Monthly Rain Totals for St. Lucie County

Month	JAN	FEB	MARCH	APRIL	MAY	JUN	JULY	AUG	SEPT	OCT	NOV	DEC	Yearly Average
Average	2.36	3.07	3.66	2.87	3.78	5.71	6.02	7.48	7.68	5.43	3.58	2.16	53.77

Source: National Climatic Data Center

Identified Problem Areas. Flood prone areas within St. Lucie County experience some level of "nuisance" flooding anywhere from once to twice a year during the rainy season. For the purposes of this document, "nuisance" flooding is defined as flooding to the extent that several inches of water standing in streets and along swells from 3 to 8 hours after a significant rain event of 3 to 5 inches in less than 24 hours. While this type of flooding takes a toll on County or municipality infrastructure and services, it does not reach a level where individual citizens report property damage through claims to the NFIP.

The St. Lucie County Division Emergency Management and the Road and Bridge Department provide for community outreach and public education on flooding hazards, prevention, precautions, and mitigation. This is done through information on the website, in brochures and handouts, and in public workshops and presentations. The mass notification system, CodeRED, is used to warn the public when flooding hazards are present. The City of Fort Pierce, City of Port St. Lucie and St. Lucie Village also provide for multiple Flood prevention programs and public education.

4.1.1.2 Historical Events

Hurricane of September 1928. This hurricane made Florida landfall near the City of Palm Beach as a strong Category 4 hurricane with one of the lowest barometric pressures ever recorded in this area (928.9 millibars [27.43 inches]). It reached Lake Okeechobee with very little decrease in intensity. In all, 1,836 people were killed and another 1,870 injured during this storm's passage. Nearly all the loss of life was in the Okeechobee area and was caused by overflowing of the lake along its southwestern shore.

Hurricane of September 1933. The 1933 Treasure Coast Hurricane formed east-northeast of the Leeward Islands on August 31, and attained maximum sustained winds of at least 140 miles per hour, making landfall near the border of Palm Beach and Martin Counties as a strong Category 3 hurricane. Buildings were blown off their foundations, and citrus groves were devastated. Stuart, Jupiter, and Fort Pierce were heavily damaged.

Flood of 1947. This Flood is generally considered the most severe Flood recorded in southern Florida. Heavy rainfall, including the rains from two hurricanes, occurred over a period of 5 months. Certain areas of St. Lucie County were flooded for months, and there was extensive damage to agriculture in general. Such a flooding event would be much more significant today because of the increase in land development along the eastern side of the County.

Hurricane of August 1949. This Category 3/Category 4 hurricane made landfall in Florida between Delray and Palm Beach with winds of 130 mph and a barometric pressure of 954.0 millibars (28.17 inches). As it moved inland, its center passed over the northern part of Lake Okeechobee, but the levees in that area held. No major flooding occurred. Damages in Florida were estimated at \$45 million. Tides of 11.3 feet at Fort Pierce, 8.5 feet at Stuart, and 6.9 feet at Lake Worth were reported. Stuart sustained severe damages in this storm. Statewide, over 500 people lost their homes as a result of this storm.

Flood of 1953. As occurred in 1947, this Flood was preceded by 5 months of heavier than normal rainfall, which included a tropical storm in October. June through October rainfall was approximately 48 inches. Damage was heaviest in the beef cattle industry, with extensive losses of improved pastureland, which required supplemental feeding of cattle. Vegetable growers and dairy farmers also suffered significant losses as a result of this flood.

Table 4.3 Recent History of Floods Impacting St. Lucie County

Date	Time	Location	Deaths/ Injuries	Estimated Property Damage	Brief Description
01/09/2004	1600- 2300	Port St. Lucie	None	220,000	A cluster of showers and isolated thunderstorms moved very slowly down the coast of St. Lucie and Martin Counties during the afternoon and early evening. Twenty-four hour rainfall totals reached 8-12 inches across much of the coastal portion of the counties, with the majority of the rain falling in a period of 6-hours or less. Flooding of many roadways occurred, stranding vehicles. Drainage canals and creeks overflowed. While high water surrounded many subdivisions, businesses and homes, water only entered one building, a St. Lucie County High School, causing an estimated \$220,000 in damage.
08/19/2008 08/20/2008	1400- 2200	St. Lucie County	None	67,000,000	On August 19th Tropical Storm Fay came on shore in south west Florida moving north northeast toward Lake Okeechobee. By the early morning of August 20th Tropical Storm Fay had moved to southern Brevard County producing rainfall amounts ranging from 10 to 15 inches in Martin, Saint Lucie, Okeechobee, and Indian River counties.
12/17/2009	2000- 0000	St. Lucie County	0	0	A large area of 5 to 13 inches of rain fell from near the Florida Turnpike, impacting western portions of Port St. Lucie, and inland to the rural portions of central and western St. Lucie County. A rainfall spotter located 4 miles west of Port St. Lucie recorded over 12 inches of rain in less than 24 hours and 6 inches in 90 minutes during the evening. Standing water levels reached up to three feet on some roadways and yards in and near the Traditions Community, causing many homes and schools to become briefly cut-off from surrounding areas. While temporary roadway, lowland and urban flooding was extensive, no homes or businesses were damaged.

Source: National Climatic Data Center

Table 4.3 Recent History of Floods Impacting St. Lucie County, Continued

Date	Time	Location	Deaths/ Injuries	Estimated Property Damage	Brief Description
08/27/12	0500- 1700	St. Lucie County	None	1,130,000	Persistent heavy rainbands from Tropical Storm Isaac produced widespread urban and lowland flooding across much of the county. Rainfall from the morning of August 26 until the evening of August 27 averaged 5 to 10 inches, with isolated totals of 12 to 14 inches, most of which fell during the morning and afternoon of August 27. The most significant impacts occurred near the coast, from Lakewood Park to Fort Pierce, White City, and Port St. Lucie. As a result, several roads in the county were temporarily impassable. Significant beach erosion occurred on the south end of the County on Highway A1A with parts of the roadway flooded and washed out.
01/09/14	1400- 2200	St. Lucie County	None	20,000	Radar-based rainfall estimates were between 6 and 12 inches across eastern-most St. Lucie County, with most of the rain falling in a 6-hour or less period. The twenty-four hour rain gage total at Ft. Pierce was 10.64 inches, but with most of the rain falling in less than 6 hours. Flooding closed many roadways, stranding vehicles. Drainage canals and creeks overflowed. While high water surrounded many subdivisions, businesses and homes, water was only reported to have entered one apartment complex in Fort Pierce (three separate buildings).

Source: National Climatic Data Center

Table 4.4 Vulnerability to Flooding

St. Lucie County									
Countywide Estimated Vulnerability to Flooding									
Structure Use	More Vulnerable		Less Vulnerable		Unknown Vulnerability		Total		
	# of Units	Value (\$) in thousands	# of Units	Value (\$) in thousands	# of Units	Value (\$) in thousands	# of Units	Value (\$) in thousands	
Single Family Residential	2,943	185,365.2	5,663	696,205.3	0	.0	8,606	881,570.5	
Multi-Family Residential	3,385	361,856.2	8,096	2,149,444.7	0	.0	11,481	2,511,300.9	
Mobile Home Residential	375	1,399.1	2,737	94,048.3	0	.0	3,112	95,447.4	
Institutional/Governmental	110	73,890.4	194	335,862.8	0	.0	304	409,753.2	
Commercial	162	335,121.4	147	491,764.7	0	.0	309	826,886.2	
Industrial	18	5,987.3	34	143,348.8	0	.0	52	149,336.1	
Agricultural	103	6,720.4	75	8,307.0	0	.0	178	15,027.4	
Miscellaneous/Undefined	10	159.7	14	636.1	0	.0	24	795.8	
Total	7,106	970,499.7	16,960	3,919,617.7	0	.0	24,066	4,890,117.5	

Source: Treasure Coast Regional Vulnerability Analysis June 2012

Flooding events can have the following potential impacts within a community:

- Excessive water;
- Soil/beach erosion;
- Electric power outage;
- Surface and air transportation disruption;
- Navigable waterway impairment;
- Potable water system loss or disruption;
- Sewer system outage;
- Human health and safety;
- Psychological hardship;
- Economic disruption;
- Disruption of community services;
- Agricultural/fisheries damage;
- Damage to critical environmental resources;
- Damage to identified historical resources;
- Fire;
- Toxic releases; and
- Storm water drainage impairment.

In St. Lucie County, nuisance flooding causes dangers on the roadways, can cause road closures due to roads being impassable or damage as a result of the flooding. This can also cause delays in emergency responses. During Tropical Storm Fay in 2008 residents were unable to get to their homes in Port St. Lucie, police assisted with transporting them to their homes.

4.1.1.3 Flooding Location

In response to mounting losses from flooding nationwide, the United States Congress initiated the NFIP in 1968. The program is administered through the St. Lucie County Water Quality Manager (WQM). Under this program, The WQM produces Flood Insurance Rate Maps (FIRMs), which show areas subject to various levels of flooding under different conditions. This Flood risk information is based on historic, meteorological, hydrologic, and hydraulic data, as well as open-space conditions, Flood control works, and development. The FIRM maps for St. Lucie County were updated in June 2014. Floodplains designated on the FIRM are based on the 1% annual Flood chance or the 100-year Flood event. The 500-year Flood event with a 0.2% annual chance of occurrence is used to designate other areas of the community, which may have some vulnerability to flooding. Any official Flood zone determination must be completed using the official paper FIRMs. **Figure 4.2** depicts the St. Lucie County Flood Zone map follows zone definitions and map legend with abbreviation definitions.

Definitions:

Flood Zones: Flood zones are geographic areas that WQM has defined according to varying levels of Flood risk and type of flooding. These zones are depicted on the published Flood Insurance Rate Map (FIRM) or Flood Hazard Boundary Map (FHBM).

Special Flood Hazard Areas: High Risk Special Flood Hazard Areas represent the area subject to inundation by 1-percent-annual chance flood. Structures located within the SFHA have a 26-percent chance of flooding during the life of a standard 30-year mortgage. Federal floodplain management regulations and mandatory Flood insurance purchase requirements apply in these zones.

Coastal High Hazard Areas – High Risk: Coastal High Hazard Areas (CHHA) represent the area subject to inundation by 1-percent-annual chance flood, extending from offshore to the inland limit of a primary front al dune along an open coast and any other area subject to high velocity wave action from storms or seismic sources. Structures located within the CHHA have a 26-percent chance of flooding during the life of a standard 30-year mortgage. Federal floodplain management regulations and mandatory purchase requirements apply in these zones.

Coastal High Hazard Areas – High Risk: Coastal High Hazard Areas (CHHA) represent the area subject to inundation by 1-percent-annual chance flood, extending from offshore to the inland limit of a primary front al dune along an open coast and any other area subject to high velocity wave action from storms or seismic sources. Structures located within the CHHA have a 26-percent chance of flooding during the life of a standard 30-year mortgage. Federal floodplain management regulations and mandatory purchase requirements apply in these zones.

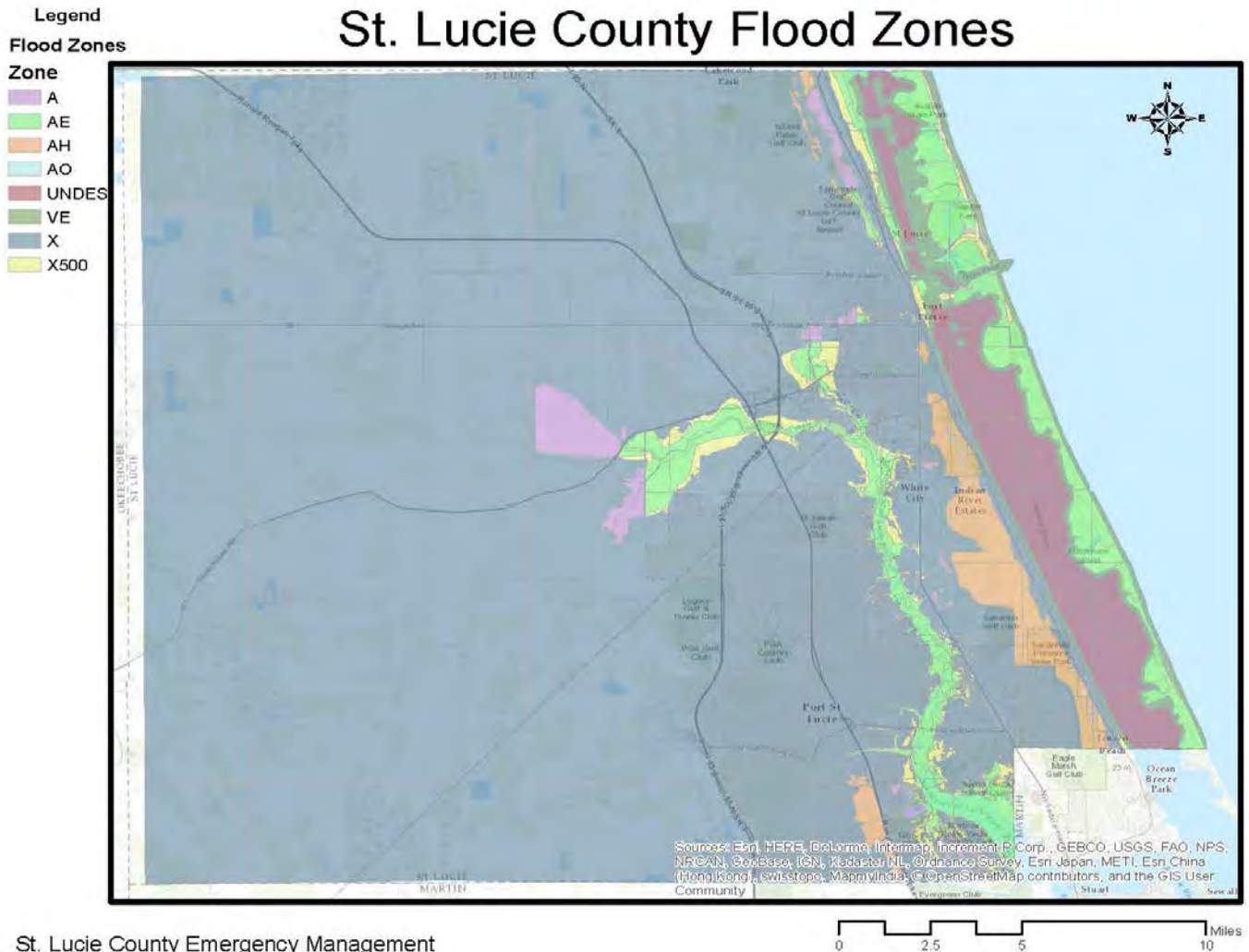
Moderate and Minimal Risk Areas: Areas of moderate or minimal hazard are studied based upon the principal source of Flood in the area. However, buildings in these zones could be flooded by severe, concentrated rainfall coupled with inadequate local drainage systems. Local stormwater drainage systems are not normally considered in a community’s Flood insurance study. The failure of a local drainage system can create areas of high Flood risk within these zones. Flood insurance is available in participating communities, but is not required by regulation in these zones. Nearly 25-percent of all Flood claims filed are for structures located within these zones.

Undetermined Risk Areas: Unstudied areas where Flood hazards are undetermined, but flooding is possible. No mandatory Flood insurance purchase requirements apply, but coverage is available in participating communities.

ZONE	DESCRIPTION
A	Areas subject to inundation by the 1-percent-annual-chance Flood event. Because detailed hydraulic analyses have not been performed, no Base Flood Elevations (BFEs) or Flood depths are shown.
AE, A1-A30	Areas subject to inundation by the 1-percent-annual-chance Flood event determined by detailed methods. BFEs are shown within these zones. (Zone AE is used on new and revised maps in place of Zones A1–A30.)
AH	Areas subject to inundation by 1-percent-annual-chance shallow flooding (usually areas of ponding) where average depths are 1–3 feet. BFEs derived from detailed hydraulic analyses are shown in this zone.
AO	Areas subject to inundation by 1-percent-annual-chance shallow flooding (usually sheet flow on sloping terrain) where average depths are 1–3 feet. Average Flood depths derived from detailed hydraulic analyses are shown within this zone.
AR	Areas that result from the decertification of a previously accredited Flood protection system that is determined to be in the process of being restored to provide base Flood protection.

A99	Areas subject to inundation by the 1-percent-annual-chance Flood event, but which will ultimately be protected upon completion of an under-construction Federal flood protection system. These are areas of special Flood hazard where enough progress has been made on the construction of a protection system, such as dikes, dams, and levees, to consider it complete for insurance rating purposes. Zone A99 may be used only when the Flood protection system has reached specified statutory progress toward completion. No BFEs or Flood depths are shown.
V	Areas along coasts subject to inundation by the 1-percent-annual-chance Flood event with additional hazards associated with storm-induced waves. Because detailed coastal analyses have not been performed, no BFEs or Flood depths are shown.
VE, V1-V30	Areas along coasts subject to inundation by the 1-percent-annual-chance Flood event with additional hazards due to storm-induced velocity wave action. BFEs derived from detailed hydraulic coastal analyses are shown within these zones. (Zone VE is used on new and revised maps in place of Zones V1–V30.)
B, X	Moderate risk areas within the 0.2-percent-annual-chance floodplain, areas of 1-percent-annual-chance flooding where average depths are less than 1 foot, areas of 1-percent-annual-chance flooding where the contributing drainage area is less than 1 square mile, and areas protected from the 1-percent-annual-chance Flood by a levee. No BFEs or base Flood depths are shown within these zones. (Zone X (shaded) is used on new and revised maps in place of Zone B.)
C, X	Minimal risk areas outside the 1-percent and .2-percent-annual-chance floodplains. No BFEs or base Flood depths are shown within these zones. (Zone X (unshaded) is used on new and revised maps in place of Zone C.)
D	Unstudied areas where Flood hazards are undetermined, but flooding is possible. No mandatory Flood insurance purchase requirements apply, but coverage is available in participating communities.

Figure 4.2– Flood Zone Map

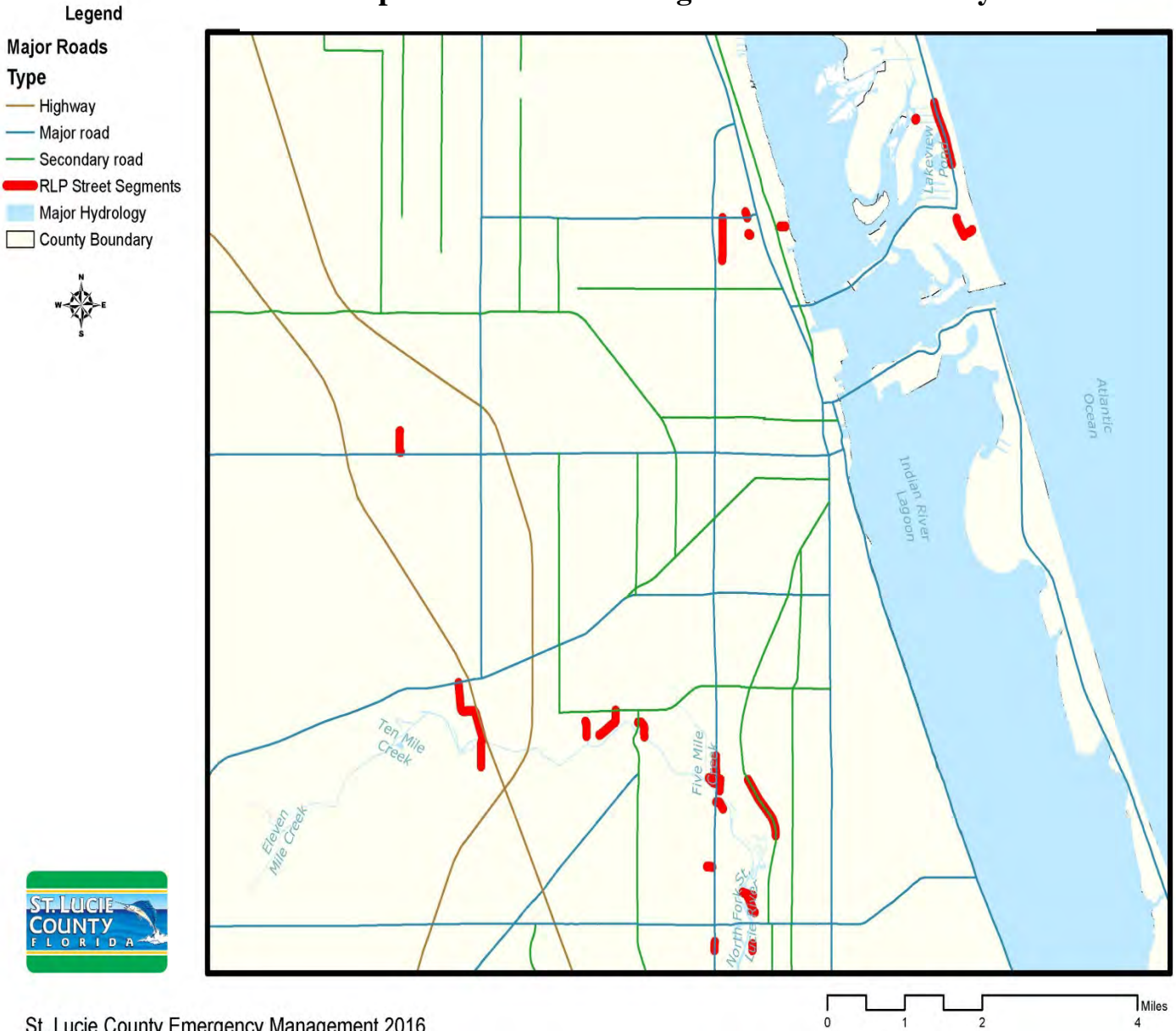


4.1.1.4 Documented Repetitive Losses

Reducing the losses associated with repetitive flood loss properties is a high priority nationally. This is reflected by the priority placed on repetitive loss properties in federal grant applications. For this analysis, documented repetitive losses are restricted to the narrow FEMA definition and represent only those properties whose owners have made more than one claim on their flood insurance policies as recorded by the NFIP. As of December 2014, St. Lucie County had a total of 107 repetitive loss properties. The City of Port St. Lucie has 9 y repetitive loss properties. For the purposes of privacy these addresses will not be incorporated into this document. **Figure 4.3** depicts street segments that have repetitive loss properties.

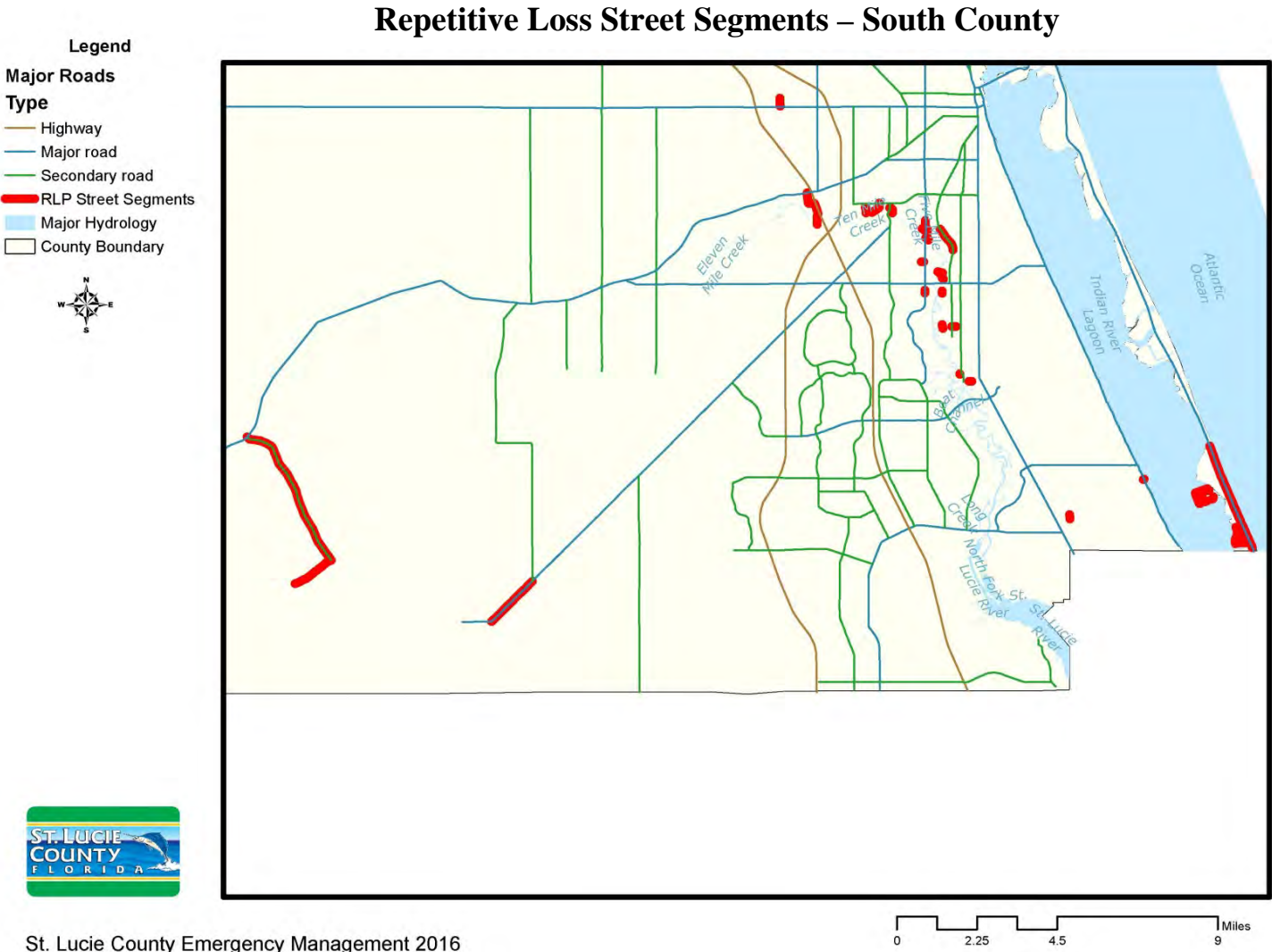
Figure 4.3– Maps of Repetitive Loss Properties in St. Lucie County

Repetitive Loss Street Segments – North County



Source: St. Lucie County, 2016

Figure 4.3 Maps of Repetitive Loss Properties in St. Lucie County Continued

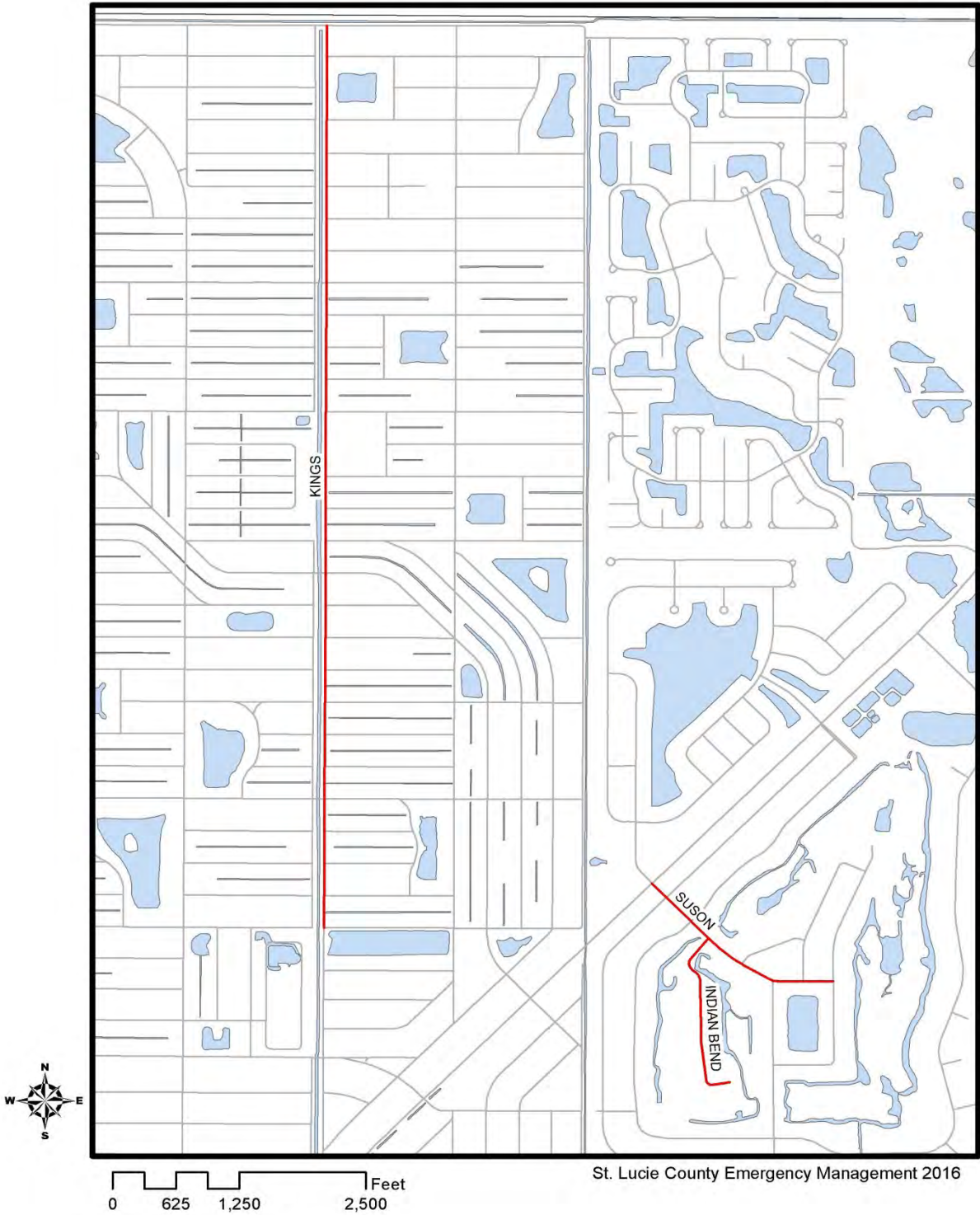


St. Lucie County Emergency Management 2016

Source: St. Lucie County, 2016

Figure 4.4 Maps of Flood Prone Streets in St. Lucie County

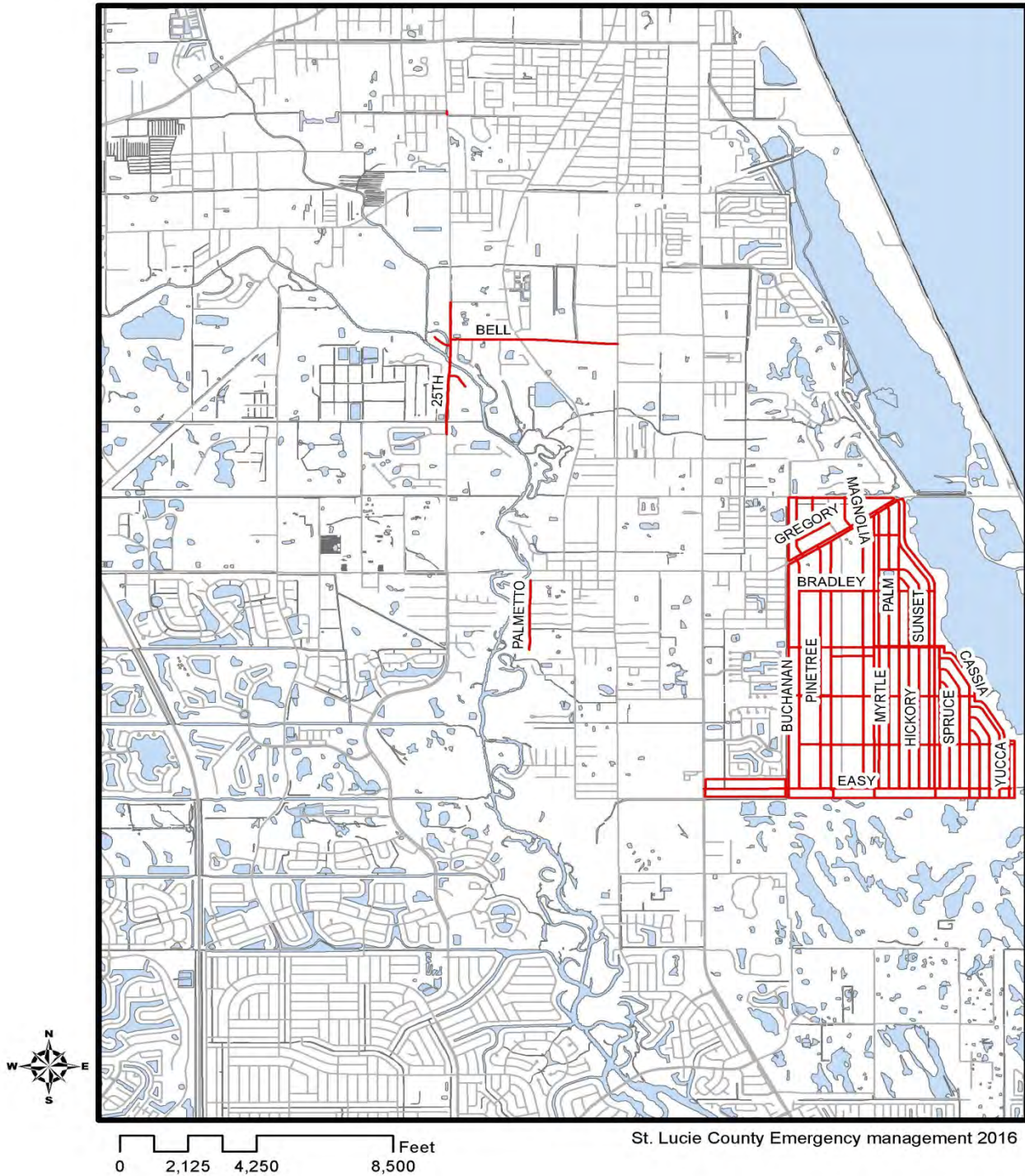
Flood Prone Streets - North County



Source: St. Lucie County, 2016

Figure 4.4 Maps of Flood Prone Streets in St. Lucie County Continued

Flood Prone Streets - South County



Source: St. Lucie County, 2016

4.1.1.5 Risk Assessment

Flooding is the single hazard producing the most recurrent impacts in St. Lucie County. All communities within St. Lucie County are vulnerable to both hurricanes and flooding, but they are not all vulnerable for the same reasons. The barrier island communities such as the Fort Pierce beach area and the unincorporated areas of Hutchinson Island obviously are highly vulnerable to both wind and storm surge damage from hurricanes. Due to the presence of the Fort Pierce Inlet, mainland Fort Pierce also is highly vulnerable to flooding associated with hurricane winds and storm surge. Central Port St. Lucie and the White City area are vulnerable to storm surge related flooding along the North Fork of the St. Lucie River and the canals in those areas. Wind packing of the water within the Indian River Lagoon also may produce substantial flooding along low-lying river front property away from the inlet. Communities away from the water such as St. Lucie West, Lakewood Park, and the unincorporated areas north of Fort Pierce along U.S. Highway 1, are more vulnerable to wind damage from hurricanes and flooding associated with rain rather than storm surge.

Flooding other than that associated with storm surge usually results from heavy rainfall events occurring in association with stalled fronts, tropical storms, and occasionally hurricanes. Not all of the area within any given jurisdiction is equally vulnerable to flooding, but all jurisdictions have specific areas where flooding is a recurring problem.

The following risk assessment data for flooding in St. Lucie County are based on data developed for the 2012 Regional Vulnerability Analysis and St. Lucie County Property Appraiser data. Table 4.5 illustrates the number and value of structures in each of the FEMA-identified flood zones. The zone with the highest number of structures and structure value is the X zone, which is known as the 500-year flood zone. Table 4.3 on 80 describes the definitions of each of the FEMA flood zones.

Table 4.5 Flooding Exposure, St. Lucie County

Flood Zone	Total Number of Structures	Total Value of Structures	Total Population in Flood Zone
AE	13,123	\$3,674,167,492	20,610
X500	3,001	\$1,011,851,442	10,878
X	105,126	\$31,702,888,284	220,882
A	414	\$149,046,350	916
VE	1,743	\$468,870,000	3,404
UNDES	369	\$64,909,278	3,435
AH	3,065	\$530,852,900	10,134
OFF FIRM	27	\$1,778,594	1,702

Table 4.5 illustrates the total number and value of structures as well as the population expected to be flooded given certain annual storm event levels.

Table 4.6 Flood Exposure Value, St. Lucie County, 2009.

Exposure	100 Year Event	50 Year Event	25 Year Event	10 Year Event
Number of Structures in Flood	16,853	14,784	11,038	777
Estimated Loss in Value*	\$3,421,997,154	\$2,463,085,864	\$1,225,902,277	\$312,116,224
Population in Flood	16,898	16,882	13,577	2,502

*Based on FDCA percent loss estimates for wind and rain; maxima estimates

Source: Florida Department of Community Affairs, 2009 and St. Lucie County Property Appraiser Data, 2009

Table 4.7 displays the flood exposure associated with the five different hurricane intensities in St. Lucie County.

Table 4.7 Hurricane Flood Exposure by Hurricane Category, St. Lucie County, 2009

Exposure	Category 5	Category 4	Category 3	Category 2	Category 1
Number of Structures in Flood	75,700	39,957	16,765	14,794	9,271
Estimated Loss in Value*	\$22,186,574,960	\$14,026,427,898	\$6,430,346,302	\$2,654,868,122	\$864,900,379
Population in Flood	159,599	78,652	18,343	16,883	9,144

*Based on FDCA percent loss estimates from wind and rain; maxima estimates

Flood Hazard Evaluation

Property damage along the coast of St. Lucie County occurs most often in the late winter or early spring and is associated with winter storms and northeasters. Flooding in the inland portions of the County occurs most often in the fall and is often associated with tropical depressions and tropical storms. Incidences of flooding in specific areas of St. Lucie County seem to be on the increase.

National Flood Insurance Program (NFIP) and Community Rating System (CRS)

All of the jurisdictions represented by the St. Lucie County LMS are active participants in the NFIP. **Table 4.8** displays NFIP policy information for each participating jurisdiction.

Table 4.8 NFIP Policy Data By Jurisdiction

Community Name	Policies In-Force	Insurance In-Force	Number of Paid Losses	Total Losses Paid
St. Lucie County	10,234	\$2,250,798,500	2,013	\$38,464,236.81
City of Fort Pierce	4,542	\$878,250,000	1,074	\$28,638,233.02
City of Port St. Lucie	6,183	\$1,685,803,000	423	\$1,755,452,19
Town of St. Lucie Village	138	\$37,244,500	68	\$2,349,744.23

Table 4.8 NFIP policy information for St. Lucie County and associated jurisdictions.

The Community Rating System (CRS) is a voluntary incentive program that recognizes and encourages community floodplain management activities that exceed minimum NFIP requirements. Any community that participates in the NFIP may elect to participate in the CRS. The goals of the CRS include reducing flood losses, facilitating accurate insurance ratings and promoting the awareness of flood insurance (FEMA, 2009). The incentives take the form of reductions on insurance premiums in 5% increments. A community's CRS class ranges from 10 (0% reduction) to 1 (45% reduction). **Table 4.9** displays CRS classes and activities for St. Lucie County and the associated jurisdictions. Three of the four jurisdictions represented by this LMS currently participate in the CRS. The Town of St. Lucie Village is currently in the process of applying for a CRS class rating.

Table 4.9 CRS Classes and Activities for St. Lucie County and Associated Jurisdictions

Community Name	St. Lucie County	City of Fort Pierce	City of Port St.
Community ID Number	120285	120286	120287
CRS Entry Date	10/01/94	10/01/92	10/01/91
Current Effective Date	05/01/09	05/01/12	10/01/96
Current Class	6	6	8
% Discount for SFHA ¹	20	20	10
% Discount for Non-SFHA ²	10	5	5
Status	C	10	C
Activities Attempted	310, 320, 330, 340, 420, 430, 440, 450, 510, 540, 610, 630	310, 320, 330, 340, 350, 360, 410, 420, 430, 440, 450, 502 510, 540, 630	310, 320, 350, 420, 430, 440, 450, 540 and 630

Source: FEMA NFIP, 2016

In order to ensure continued compliance with the NFIP, each jurisdiction will:

- Continue to enforce their adopted Floodplain Management Ordinance requirements, which include regulating all new development and substantial improvements located in the Special Flood Hazard Areas (SFHA)
- Ensure that each jurisdiction has an office and staff person designated as the Floodplain Administrator
- Continue to update the floodplain ordinance upon receiving new data from FEMA
- Continue to educate the public about the importance of flood hazards and the availability of flood insurance
- Continue to maintain or enhance their Community Rating System (CRS) scores

In an additional effort to ensure continued compliance with the NFIP, the City of Port St. Lucie has included a six (6) inch freeboard above base flood elevation (BFE) for all new residential structures within their current Floodplain Ordinance. This ordinance is very significant considering the fact that a majority of the recent population growth and new construction has occurred within and proximate to the City of Port St. Lucie.

As part of the NFIP and CRS programs, FEMA documents repetitive flood losses. For this analysis, documented repetitive losses are restricted to the narrow FEMA definition and represent only those properties whose owners have made more than one claim on their flood insurance policies as recorded by the NFIP. As of March 2016, the unincorporated area of St. Lucie County had a total of 107 repetitive loss properties with a total of 317 repetitive losses. The City of Fort Pierce had 119 repetitive loss properties with a total of 246 repetitive losses. There were four repetitive loss properties reported from the Town of St. Lucie Village with a total of nine repetitive losses. The City of Port St. Lucie showed a total of nine repetitive loss properties with a total of 17 repetitive losses.

Table 4.10 documents the number of repetitive flood loss properties by jurisdiction and type. All repetitive loss properties within the County are residential properties.

Table 4.10 Repetitive Loss Properties for St. Lucie County and Associated Jurisdictions

Community	St. Lucie County	City of Fort Pierce	City of Port St. Lucie	Town of St. Lucie Village
Community No.	120285	120286	120287	120288
Repetitive Loss Properties	Total -107 Residential – 106 Commercial - 1	Total - 119 Residential – 113 Commercial - 6	Total - 9 Residential – 9 Commercial - 0	Total - 4 Residential – 4 Commercial - 0
Claimed Repetitive Losses	317	246	17	9
Total Building Payment	\$15,802,486	\$7,687,574	\$77,502	\$12,605
Total Content Payment	\$1,744,305	\$2,119,789	\$12,605	\$51,870

Source: FEMA NFIP, 2016

The probability for future flooding in St. Lucie County is high, and based on recent rain events and potential climate change will continue to grow. While the probability is high is area specific and all jurisdictions of the County are at risk. Flooding along the coast of the County occurs in late winter and early spring due to rough seas and high surf. From June to December damage would be caused by tropical systems. Flooding in inland areas of the county are in the fall from tropical storms and depressions, during the rainy season and in dry season in el nino periods.

4.1.2 Hurricanes/Tropical Storms

4.1.2.1 Hazard Identification

Tropical Storms

A tropical storm is a tropical cyclone with maximum sustained winds of at least 39 mph. Tropical storms are given official names once they reach these wind speeds. Beyond 74 mph, a tropical storm is categorized a hurricane, typhoon, or cyclone based on the storm location.

A tropical cyclone has a defined cyclonic rotation and severe thunderstorms around a central low-pressure zone. A tropical cyclone is one step above a tropical depression, but a step below a hurricane in terms of intensity.

A ***Tropical Storm Watch*** is issued by the National Hurricane Center (NHC) when tropical-storm conditions are possible within the specified area. A ***Tropical Storm Warning*** is issued by the NHC when tropical-storm conditions are expected within the specified area.

Hurricanes

Hurricanes are tropical cyclones with winds that exceed 74 mph and blow counter-clockwise about their centers in the Northern Hemisphere. They are essentially heat pumping mechanisms that transfer the sun's heat energy from the tropical to the temperate and polar regions. This helps to maintain the global heat budget and sustain life. Hurricanes are formed from thunderstorms that form over tropical oceans with surface temperatures warmer than 81°F (26.5°C). The ambient heat in the sea's surface and moisture in the rising air column set up a low pressure center and convective conditions that allow formation of self-sustaining circular wind patterns. Under the right conditions, these winds may continue to intensify until they reach hurricane strength. This heat and moisture from the warm ocean water is the energy source of a hurricane. Hurricanes weaken rapidly when deprived of their energy source by traveling over land or entering cooler waters.

When a hurricane threatens the coast, advisories are issued by the NHC. In addition to advisories, the National Hurricane Center may issue a hurricane watch or warning.

A hurricane watch indicates that hurricane conditions are a possibility and may threaten the area within 48 hours. A hurricane warning is issued when winds of at least 74 mph are to be expected in the area within 36 hours. Advisories and hurricane watches and warnings will frequently refer to the category of the storm. Hurricanes are classified using the Saffir-Simpson scale as follows:

The Saffir-Simpson Hurricane Wind Scale is a 1 to 5 rating based on a hurricane's sustained wind speed. This scale estimates potential property damage. Hurricanes reaching Category 3 and higher are considered major hurricanes because of their potential for significant loss of life and damage. Category 1 and 2 storms are still dangerous, however, and require preventative measures.

Hurricanes are classified using the Saffir-Simpson scale as depicted in **Table 4.11** on the next page.

Table 4.11 Saffir-Simpson Hurricane Wind Scale

Category	Sustained Winds	Types of Damage Due to Hurricane Winds
1	74-95 mph	Very dangerous winds will produce some damage: Well-constructed frame homes could have damage to roof, shingles, vinyl siding and gutters. Large branches of trees will snap and shallowly rooted trees may be toppled. Extensive damage to power lines and poles likely will result in power outages that could last a few to several days.
2	96-110 mph	Extremely dangerous winds will cause extensive damage: Well-constructed frame homes could sustain major roof and siding damage. Many shallowly rooted trees will be snapped or uprooted and block numerous roads. Near-total power loss is expected with outages that could last from several days to weeks.
3 (major)	111-129 mph	Devastating damage will occur: Well-built framed homes may incur major damage or removal of roof decking and gable ends. Many trees will be snapped or uprooted, blocking numerous roads. Electricity and water will be unavailable for several days to weeks after the storm passes.
4 (major)	130-156 mph	Catastrophic damage will occur: Well-built framed homes can sustain severe damage with loss of most of the roof structure and/or some exterior walls. Most trees will be snapped or uprooted and power poles downed. Fallen trees and power poles will isolate residential areas. Power outages will last weeks to possibly months. Most of the area will be uninhabitable for weeks or months.
5 (major)	157 mph or higher	Catastrophic damage will occur: A high percentage of framed homes will be destroyed, with total roof failure and wall collapse. Fallen trees and power poles will isolate residential areas. Power outages will last for weeks to possibly months. Most of the area will be uninhabitable for weeks or months.

Source: National Hurricane Center, 2013.

Many, if not the majority of existing homes and businesses along the U.S. Atlantic and Gulf Coasts were located there during the 1970's and 1980's, a period of relatively inactive hurricane formation. Most of the people currently living and working in coastal areas have never experienced the impact of a major hurricane. Hurricanes that impacted Florida during the 1970's and 80's were infrequent and of relatively low intensity. Homeowners, business owners, and government officials grew to regard hurricane risk as manageable by private insurance supplemented occasionally by federal disaster funding and subsidized flood insurance. The hurricane risk did not seem sufficient to warrant increased investment in mitigation. Two major hurricanes, Hugo in 1989 and Andrew in 1992, forced a re-evaluation of this risk assessment.

While experts sometimes disagree on the annual cost, all sources agree that Hurricane Andrew was the most costly hurricane event ever to affect the U.S. Insured losses from Hurricane Andrew topped \$17 billion, and most sources agree that the total cost of Hurricane Andrew exceeded \$25 billion.

An average of 1.75 hurricanes strikes the U.S. every year. Florida is the most hurricane-prone state, and St. Lucie County has a history of major storms, which have impacted the area with severe property damage. The County's rapid growth, mainly during inactive hurricane period in the 1970s, 1980s, and 1990s, has resulted in increased potential for property damage and human suffering. Most of this new development was along the Atlantic shoreline as well as the Indian and St. Lucie Rivers. The proximity of so many people living so close to the Atlantic Ocean, as well as the low coastal elevations, significantly increases the County's vulnerability. The barrier island towns of Port St. Lucie and Jupiter Island are vulnerable to storm surge and high wind damage, as are the communities fronting on the estuaries and rivers, while the inland area is more vulnerable to wind damage and freshwater flooding from rainfall.

Historically, hurricane impacts to the County were Floyd and Irene, which struck Florida in September and October 1999 respectively. Most recently, Hurricanes Frances and Jeanne (2004), both directly hit St. Lucie County. Hurricane Wilma (2005) crossed the southern half of Florida and exited the state just north of the County. Hurricane Ernesto threatened the area in 2006 but was not a direct hit. Tropical Storm Fay (2008) and Hurricanes Isaac and Sandy in 2012 impacted the area with flooding and severe beach erosion.

Florida not only has the most people at risk from hurricanes, but it also has the most coastal property exposed to these storms. Between 1970 and 2010, Florida's population increased by 195.7%.

Hurricane Impacts. Hurricane damage occurs through two means:

- Storm Surge
- High Winds

Storm Surge

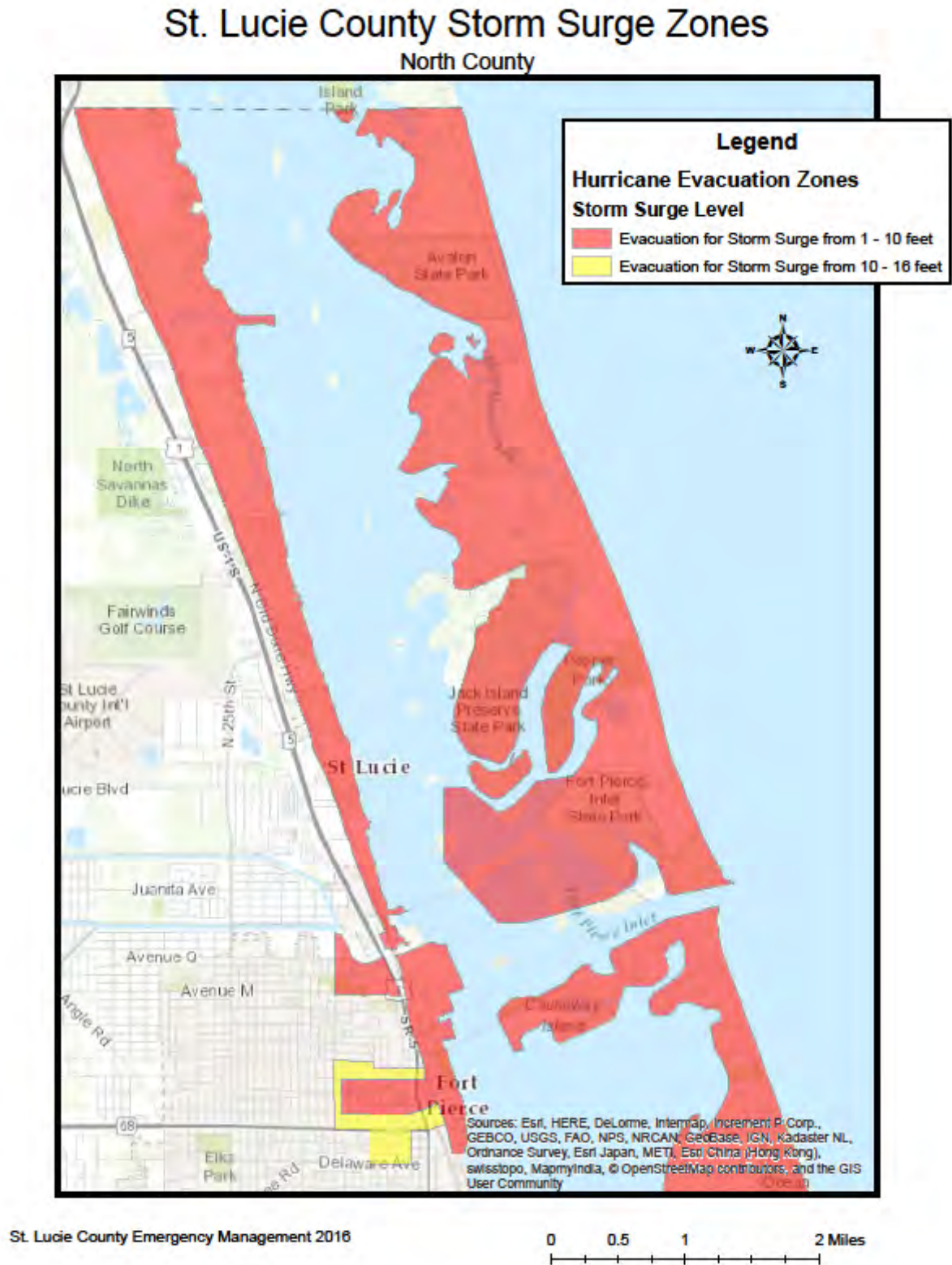
A storm surge is a large dome of water often 50 to 100 miles wide and rising anywhere from 4 to 5 feet in a Category 1 hurricane up to 20 feet in a Category 5 storm. The storm surge arrives ahead of the storm's actual landfall, and the more intense the hurricane is, the sooner the surge arrives. Water rise can be very rapid posing a serious threat to those who have waited to evacuate flood prone areas. A storm surge is a wave that has outrun its generating source and become a long period swell.

The surge is always highest in the right-front quadrant of the direction the hurricane is moving in. As the storm approaches shore, the greatest storm surge will be to the north of the hurricane's eye.

Such a surge of high water topped by waves driven by hurricane force winds can be devastating to coastal regions. The stronger the hurricane and the shallower the offshore water, the higher the surge will be. In addition, if the storm surge arrives at the same time as the high tide, the water height will be even greater. The storm tide is the combination of the storm surge and the normal astronomical tide.

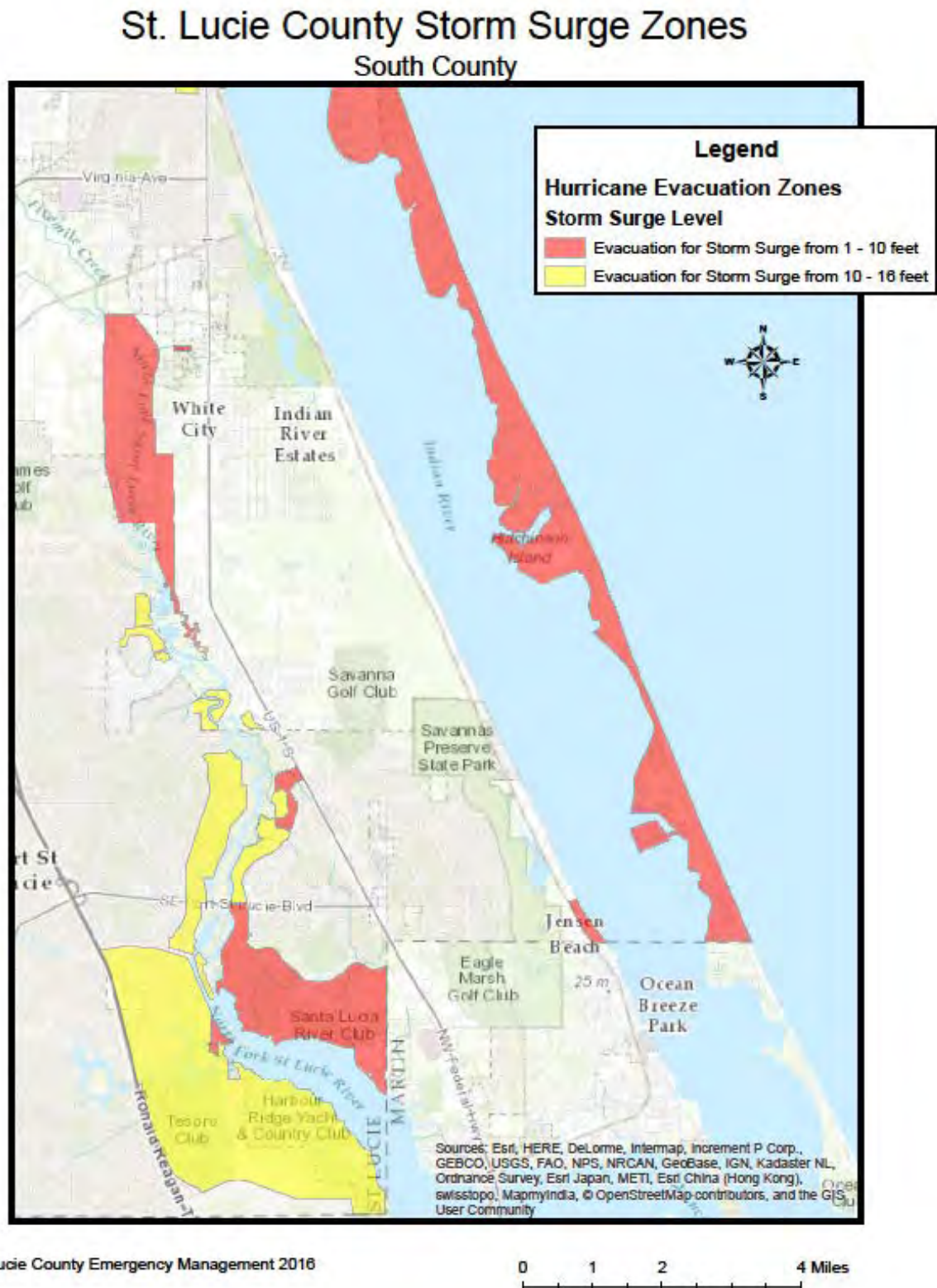
The greatest threats to St. Lucie County posed by hurricanes or tropical storms are the effects of storm surge, especially along the (barrier) Hutchinson Island and on the Atlantic side and the periphery of the Indian River Lagoon. The combination of high tides and wind can create coastal, estuarine flooding and saltwater inundation. As reported in the Treasure Coast Regional Evacuation Study 2010, potential storm tide heights for St. Lucie County range from up to 4.5' in a Category 1 storm to up to 16.5' in a Category 5 storm.

Figure 4.5 Storm Surge Maps for St. Lucie County



Source: St. Lucie County Division of Emergency Management

Figure 4.5 Storm Surge Maps for St. Lucie County Continued



Source: St. Lucie County Division of Emergency Management

Figure 4.6 Hurricane Evacuation Zone Maps for St. Lucie County

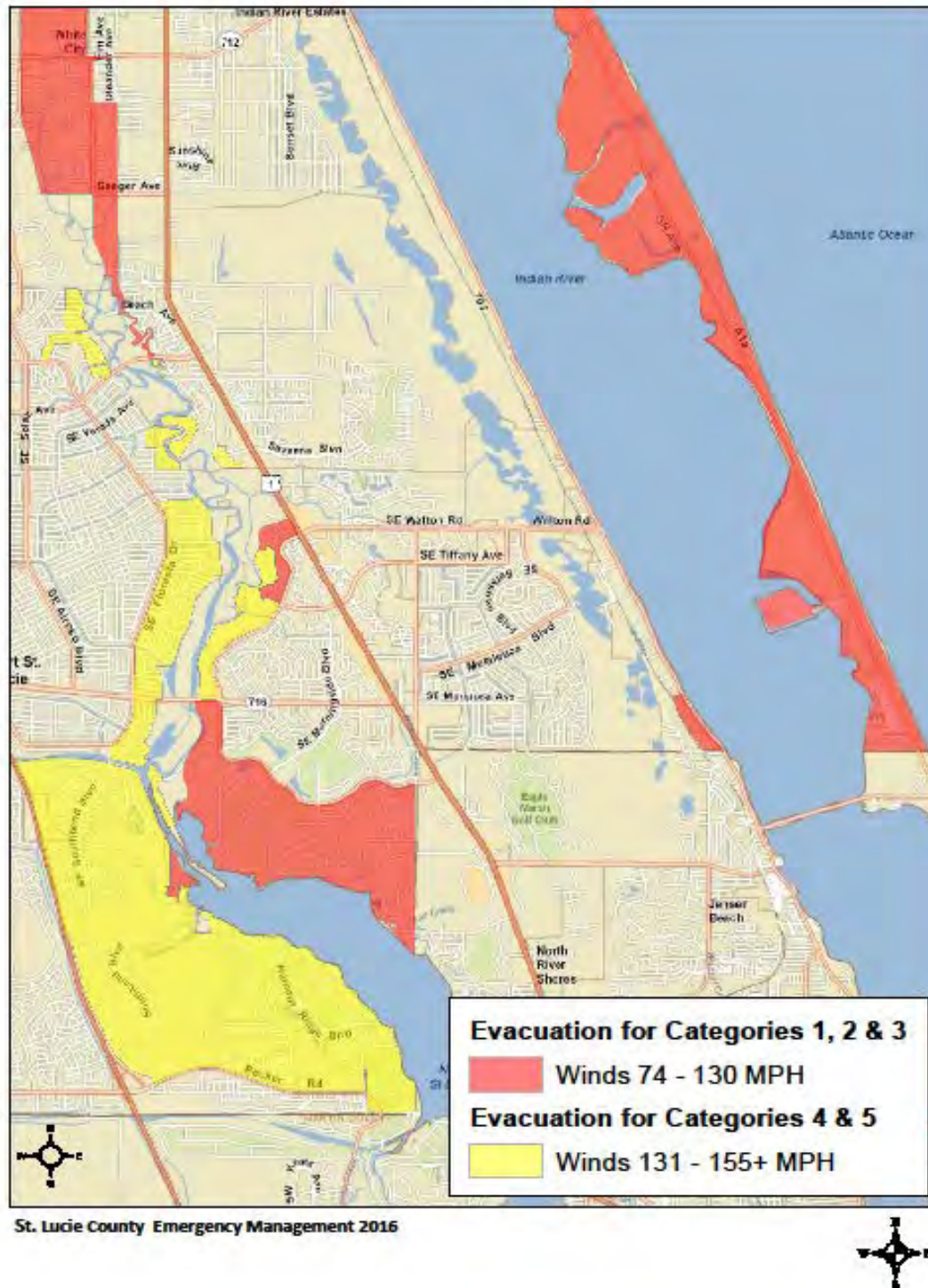
St. Lucie County Hurricane Evacuation Zones North County



Source: St. Lucie County Division of Emergency Management

Figure 4.6 Hurricane Evacuation Zone Maps for St. Lucie County, Continued

St. Lucie County Hurricane Evacuation Zones South County



Source: St. Lucie County Division of Emergency Management

High Winds

Generally, it is the wind that produces most of the property damage associated with hurricanes, while the greatest threat to life is from flooding and storm surge. Although hurricane winds can exert tremendous pressure against a structure, a large percentage of hurricane damage is caused not from the wind itself, but from flying debris. Tree limbs, signs and sign posts, roof tiles, metal siding, and other loose objects can become airborne missiles that penetrate the outer shells of buildings, destroying their structural integrity and allowing the hurricane winds to act against interior walls not designed to withstand such forces. Once a structure's integrity is breached, the driving rains associated with hurricanes can enter the structure and destroy its contents.

Hurricane winds are unique in several ways:

- They are more turbulent than winds in most other types of storms;
- They are sustained for a longer period of time (several hours) than any other type of atmospheric disturbance;
- They change slowly in direction, thus they are able to seek out the most critical angle of attack on a given structure; and
- They generate large quantities of flying debris as the built environment is progressively damaged, thus amplifying their destructive power.
- In hurricanes, gusts of wind can be expected to exceed the sustained wind velocity by 25% to 50%. This means a hurricane with sustained winds of 150 mph will have wind gusts exceeding 200 mph. The wind's pressure against a fixed structure increases with the square of the velocity. For example, a 100-mph wind will exert a pressure of approximately 40 pounds per square foot on a flat surface, while a 190-mph wind will exert a force of 122 pounds per square foot on that same structure. In terms of a 4- by 8-foot sheet of plywood nailed over a window, there would be 1,280 pounds of pressure against this sheet in a 100-mph wind, and 3,904 pounds or 1.95 tons of pressure against this sheet in a 190-mph wind.

The external and internal pressures generated against a structure vary greatly with increases in elevation, shapes of buildings, openings in the structures, and the surrounding buildings and terrain. Buildings at ground level experience some reductions in wind forces simply because of the drag exerted by the ground against the lowest levels of the air column. High-rise buildings, particularly those located along the beachfront will receive the full strength of a hurricane's winds on their upper stories. Recent studies estimate that wind speed increases by approximately 37% just 15 feet above ground level.

The wind stream generates uplift as it divides and flows around a structure. The stream following the longest path around a building, generally the path over the roof, speeds up to rejoin the wind streams following shorter paths, generally around the walls. This same phenomenon generates uplift on an aircraft's wing. The roof in effect becomes an airfoil that is attempting to "take off" from the rest of the building. Roof vortexes generally concentrate the wind's uplift force at the corners of a roof. These key points can experience uplift forces two to five times greater than those exerted on other parts of the roof.

Once the envelope of the building has been breached through the loss of a window or door, or because of roof damage, wind pressure on internal surfaces becomes a factor. Openings may cause pressurizing or depressurizing of a building. Pressurizing pushes the walls out, while depressurizing will pull the walls in. Internal pressure coupled with external suction adds to the withdrawal force on sheathing fasteners. Damages from internal pressure fluctuations may range from blowouts of windows and doors to total building collapse due to structural failure.

During Hurricane Andrew, catastrophic failure of one- and two-story wood-frame buildings in residential areas was observed more than catastrophic failures in other types of buildings. Single-family residential construction is particularly vulnerable because less engineering oversight is applied to its design and construction. As opposed to hospitals and public buildings, which are considered "fully engineered," and office and industrial buildings, which are considered "marginally engineered," residential construction is considered "non-engineered." Historically, the bulk of wind damage experienced nationwide has occurred to residential construction. Fully engineered construction usually performs well in high winds due to the attention given to connections and load paths.

Hurricane winds generate massive quantities of debris that can easily exceed a community's entire solid waste capacity by three times or more. Debris removal is an integral first step toward recovery, and as such, must be a critical concern of all those tasked with emergency management and the restoration of community services.

The following table (next page) depicts St. Lucie County's vulnerability to wind damage as a result of a hurricane.

Table 4.12 Vulnerability to Wind Damage in Hurricanes

St. Lucie County										
Countywide Estimated Vulnerability to Wind										
Structure Use	Most Vulnerable		Moderately Vulnerable		Least Vulnerable		Unknown Vulnerability		Total	
	# of Units	Value (\$) in thousands	# of Units	Value (\$) in thousands	# of Units	Value (\$) in thousands	# of Units	Value (\$) in thousands	# of Units	Value (\$) in thousands
Single Family Residential	52,266	3,015,222.8	11,162	1,159,692.9	34,42	3,783,829.5	0	.0	97,855	7,958,745.2
Multi-Family Residential	12,625	1,576,224.0	1,228	832,146.9	3,46	1,221,194.7	0	.0	17,319	3,629,565.6
Mobile Home Residential	3,017	70,479.6	853	39,199.2	97	54,399.8	0	.0	4,848	164,078.6
Institutional/Governmental	1,796	1,123,799.8	292	315,082.8	33	1,024,289.4	3	4,297.9	2,426	2,467,469.9
Commercial	1,473	2,123,736.6	408	650,662.0	56	889,266.2	1	66.3	2,449	3,663,731.1
Industrial	906	332,011.2	218	89,956.8	53	335,427.8	1	572.7	1,663	757,968.5
Agricultural	983	203,817.6	90	45,278.5	18	69,118.7	0	.0	1,256	318,214.8
Miscellaneous/Undefined	76	38,200.1	16	8,999.5	21	3,626.7	0	.0	113	50,826.3
Total	73,142	8,483,491.7	14,267	3,141,018.6	40,51	7,381,152.8	5	4,936.9	127,929	19,010,600.0

Source: Treasure Coast Regional Vulnerability Analysis June 2012

Table 4.13 - Debris Probability Based on a 10-Year Storm Event

Debris - 10 Year Event	Brick, Wood and Other	Reinforced. Concrete/ Steel	Eligible Tree Debris	Other Tree Debris	Total
St. Lucie	11,128	0	11,280	24,190	46,598
Total	11,128	0	11,280	24,190	46,598
Study Region Total	11,128	0	11,280	24,190	46,598

Source: Hazus Software (2016)

Other Impacts

Damage during hurricanes also may result from possible spawned tornadoes, and inland flooding associated with heavy rainfall that usually accompanies these storms. Hurricane Andrew, a relatively "dry" hurricane, dumped 10 inches of rain on south Florida and left many buildings extensively water damaged. Rainwater may seep into gaps in roof sheathing and saturates insulation and ceiling drywall, in some cases causing ceilings to collapse.

Tropical Storm Mitch dropped as much as 10 inches of rain in some south Florida areas, which resulted in approximately \$20 million in crop damage in Palm Beach County alone (Associated Press, 1998). According to the 2014 St. Lucie County CEMP, of St. Lucie County's 337,040 total land acreage, 195,155 are farmland. St. Lucie County is particularly vulnerable to crop damage resulting from the wind and rain from hurricanes and tropical storms.

4.1.2.2 Historic Events

From 1930 through 1959, a total of 58 hurricanes struck the U.S. mainland; 25 of which were Category 3 or higher (major storms). Between 1960 and 1989, 43 hurricanes struck the U.S., of which only 16 were Category 3 or stronger. Most hurricane experts feel we are entering a period of increased hurricane formation similar to the levels seen in the 1930's and 1940's. Current hurricane risk calculations are complicated by climatic factors suggesting the potential for even greater hurricane frequency and severity in all of the world's hurricane spawning grounds. Since 1995, there have been 110 Atlantic hurricanes, and there were 15 in 2005, 12 in 2010, and 10 in 2012 respectively (Weather Underground, 2015). Global warming may cause changes in storm frequency and the precipitation rates associated with storms. A modest 0.9°F (0.5°C) increase in the mean global temperature will add 20 days to the annual hurricane season and increase the chances of a storm making landfall on the U.S. mainland by 33%. The warmer ocean surface also will allow storms to increase in intensity, survive in higher latitudes, and develop storm tracts that could shift farther north, producing more U.S. landfalls.

Currently an average of 1.75 hurricanes strike the U.S. every year. Severe (Category 4 or 5 on the Saffir-Simpson scale) hurricanes strike the U.S. on the average of 3 every 5 years. Annually, hurricanes are estimated to cause approximately \$1.2 billion in damages. The proximity of dense population to the Atlantic Ocean, as well as the generally low coastal elevations, significantly increases the County's vulnerability. The potential for property damage and human casualties in St. Lucie County has increased over the last several decades primarily because of the rapid growth this County has experienced since 1970, particularly along the vulnerable coastline areas.

Since 1852, over 175 storms of hurricane intensity have passed within 125 miles of St. Lucie County. This represents an average of one hurricane every year, and in 2004, St. Lucie County experienced two.

Since 1851 there have been 290 hurricanes that have struck the United States from Texas to Maine. Of those 2940%, or 114, have made landfall in Florida. There have been 37 Major hurricane strikes to Florida (NOAA 2016).

Table 4.14- Number of Tropical Depressions, Tropical Storms, and Hurricanes for Past 5 Years

Number of Atlantic tropical storms	Tropical Depressions	Tropical Storms	Hurricanes
2015	1	1	4
2014	1	1	5
2013	1	11	2
2012	0	9	10
2011	1	12	7
2010	2	7	12

Source, National Hurricane Center, 2016

Table 4.15 St. Lucie County Recent Tropical Storm and Hurricane History

Date	Time	Name	Deaths/ injuries	Estimated Property Damage	Brief Description
10/15/1999 10/16/1988	2000- 1200	Irene	None	8,000,000	Minimal Hurricane Irene moved northeast from the Florida Keys across south Florida and emerged over the Atlantic near Ft. Pierce. In Martin and St. Lucie counties the greatest impact from the storm was flooding. From 5 to 9 inches of rain fell over the area flooding 300 homes. About 50 homes had major wind damage and thousands of trees were blown down.
9/4/2004	1949	Frances	None	4.8 Billion	The center of category 2 Hurricane Frances reached the Florida east coast near Port St. Lucie in Martin County early on September 5th. Frances was moving to the west northwest at 7 mph and maintained hurricane strength as it crossed the east half of the Florida Peninsula. Frances was downgraded to a tropical storm in the afternoon on the 5th when it was about 50 miles east of Tampa Bay. In Martin, St. Lucie and Indian River counties, the slow moving storm produced wind gusts to hurricane strength for about 19 hours, producing an estimated 4.5 billion dollars in damage. Wind gusts well over 100 mph destroyed coastal structures, marinas, and vessels. Farther inland, hundreds of homes, mobile homes, and businesses were destroyed, and thousands were damaged. Highest recorded winds for St. Lucie County were 91 knots (105 mph) at St. Lucie Inlet.
9/25/2004	1400- 0500	Jeanne	None	1.2 Billion	The center of category 3 Hurricane Jeanne reached the Florida east coast near Port St. Lucie in St. Lucie County shortly after midnight on September 26th, this is in the same location where Hurricane Frances came ashore on September 5th. Jeanne was moving to the west northwest at 12 mph and maintained hurricane strength as it crossed most of the Florida Peninsula. Jeanne was downgraded to a tropical storm in the afternoon of September 26th when it was about 40 miles northeast of Tampa Bay. The eye of Hurricane Jeanne passed over the community of Sewell' Point in Martin County. Over 180 residences were destroyed with about 4000 residences either damaged or destroyed. The highest wind speed recorded was 91 kts (105 mph) in Jensen Beach. No pressure data was recorded for St. Lucie County. Severe beach erosion occurred compounding the damage from Hurricane Frances just 3 weeks earlier.

Source: National Climatic Data Center

Table 4.15 St. Lucie County Tropical Storm and Hurricane History, Continued

Date	Time	Name	Deaths/ injuries	Estimated Property Damage	Brief Description
10/14/2005	0500- 1500	Wilma	None	8,000,000	Hurricane Wilma crossed the southern Florida Peninsula from the southwest exiting the state and moving over the Atlantic Ocean over the Martin/Palm Beach county line. The northern half of the eyewall of Hurricane Wilma moved over coastal St. Lucie County as Wilma moved off shore. The strongest winds in St. Lucie County occurred as the winds backed to the north with the large eye of Wilma over the coast of St. Lucie County. Estimated wind gust over 100 mph occurred along the beaches. Wilma produced widespread wind damage across the county. Forty eight residences were destroyed and 120 suffered major damage. Most of these were mobile homes. More than 90 percent of St. Lucie County was without electricity. The county's main hospital, Martin Memorial, sustained enough damage to stop taking new patients. As much as 3 to 5 inches of rain fell across the county. Total crop loss including vegetables, citrus and sugar equals \$48 million. The highest reported wind gust was 108 mph (94 knots) at the St. Lucie County EOC at Hobe Sound. Lowest recorded surface pressure was 992.0 millibars from a vessel in the St. Lucie River. Actual surface pressure was likely lower.
8/19/2008	1200- 2200	Fay	None	70,000,000	On the morning of August 19th, Tropical Storm Fay came onshore in southwest Florida, moving north-northeast toward Lake Okeechobee. Fay was well formed and actually intensified over land, exhibiting a classical tropical cyclone eye as it reached peak intensity over the western shore of Lake Okeechobee. Wind gusts of 58 mph were reported in the town of Okeechobee. By the early morning of August 20th, Tropical Storm Fay had moved to southern Brevard County, producing widespread wind gusts over 50 mph. Patrick AFB reported a gust to 62 mph. Fay produced torrential rain along the Space and Treasure coasts on the 20th as the circulation center moved up the Brevard County coast and into the near shore Atlantic waters near Edgewater. Rainfall amounts on the 20th were near 8 to 9 inches in St. Lucie County. In St. Lucie County, rainfall amounts of 10 to 15 inches fell over most of the coastal region, flooding over 55 homes. Damage estimates were over \$70 million. Wind gusts in the western part of the county near Lake Okeechobee were estimated to be near 50 mph.
8/27/2012	0500- 1700	Isaac	None	1,106,891	Persistent heavy rain bands from Tropical Storm Isaac produced widespread flooding across the county. Rainfall totals from the morning of August 26 through late on August 27 averaged 5 to 10 inches, with isolated totals of 12 to 14 inches. Peak wind gusts reached 35-45 mph along the coast and shore of Lake Okeechobee.
10/26/2012	0000- 1600	Sandy	None	3,188,227	Hurricane Sandy moved slowly northwest, parallel to the Florida coast, 200-250 miles offshore. Due to the very expansive wind fields associated with the hurricane, sustained tropical storm winds reached the east-central Florida beaches and adjacent portions of the barrier islands. Large and pounding surf affected the beaches for six or more high tide cycles, during a period of high astronomical tides. Significant beach erosion occurred in south end of South Hutchinson Island. Sections of South Highway A1A flooded and a small section washed out. Damage estimates for the east-central Florida beaches totaled \$46 million dollars. St. Lucie County sustained \$3,188,277 in damages, \$1,095,677 to mosquito impoundments and \$2,122,600 to beaches on South Hutchinson Island.

Source: National Climatic Data Center

4.1.2.3 Vulnerability Assessment

St. Lucie County is vulnerable to or may be impacted by a Tropical Storm and up to a Category 5 Hurricane. Hurricane events can have the following potential impacts within a community:

- Excessive wind;
- Excessive water;
- Soil/beach erosion;
- Electric power outage;
- Surface and air transportation disruption;
- Navigable waterway impairment;
- Potable water system loss or disruption;
- Sewer system outage;
- Telecommunications system outage;
- Human health and safety;
- Psychological hardship;
- Economic disruption;
- Disruption of community services;
- Agricultural/fisheries damage;
- Damage to critical environmental resources;
- Damage to identified historical resources;
- Fire;
- Toxic releases; and
- Storm water drainage impairment.

The following tables (next page) depicts St. Lucie County's vulnerability to wind and surge damage as a result of a hurricane.

Table 4.16 Vulnerability to Storm Surge

St. Lucie												
Countywide Estimated Vulnerability to Surge												
Structure Use	Category 1		Category 2		Category 3		Category 4		Category 5		Total	
	# of Units	Value (\$) in	# of Units	Value (\$) in	# of Units	Value (\$) in	# of Units	Value (\$) in	# of Units	Value (\$) in	# of Units	Value (\$) in
Single Family Residential	1,967	260,543,100	1,246	130,477,800	1,321	142,554,700	759	99,006,700	2,520	233,540,800	7,813	866,123.1
Multi-Family Residential	5,201	923,935,100	3,049	534,407,100	1,151	272,015,200	53	3,813,000	49	7,251,100	9,503	1,741,421.5
Mobile Home Residential	458	13,423,200	1,594	38,140,900	4	1,012,800	66	983,900	136	3,285,400	2,258	56,846.2
Institutional/Governmental	130	214,295,500	13	2,480,300	24	16,330,700	20	49,419,700	68	23,525,500	255	306,051.7
Commercial	116	560,189,496	29	16,167,300	29	15,248,900	20	2,995,600	72	22,919,800	266	617,521.1
Industrial	15	5,490,400	2	314,600	6	1,421,300	30	8,371,700	14	5,971,600	67	21,569.6
Agricultural	12	928,100	1	37,100	1	42,800	0	0	6	1,043,300	20	2,051.3
Miscellaneous/Undefined	6	312,100	4	89,600	3	192,700	0	0	1	10,700	14	605.1
Total	7,905	1,979,117.0	5,938	722,114.7	2,539	448,819.1	948	164,590.6	2,866	297,548.2	20,196	3,612,189.6

Table 4.17 Vulnerability to Wind Damage in Hurricanes

St. Lucie County										
Countywide Estimated Vulnerability to Wind										
Structure Use	Most Vulnerable		Moderately Vulnerable		Least Vulnerable		Unknown Vulnerability		Total	
	# of Units	Value (\$) in thousands	# of Units	Value (\$) in thousand	# of Units	Value (\$) in thousands	# of Units	Value (\$) in thousands	# of Units	Value (\$) in thousands
Single Family Residential	52,266	3,015,222.8	11,162	1,159,692.9	34,42	3,783,829.5	0	.0	97,855	7,958,745.2
Multi-Family Residential	12,625	1,576,224.0	1,228	832,146.9	3,46	1,221,194.7	0	.0	17,319	3,629,565.6
Mobile Home Residential	3,017	70,479.6	853	39,199.2	97	54,399.8	0	.0	4,848	164,078.6
Institutional/Governmental	1,796	1,123,799.8	292	315,082.8	33	1,024,289.4	3	4,297.9	2,426	2,467,469.9
Commercial	1,473	2,123,736.6	408	650,662.0	56	889,266.2	1	66.3	2,449	3,663,731.1
Industrial	906	332,011.2	218	89,956.8	53	335,427.8	1	572.7	1,663	757,968.5
Agricultural	983	203,817.6	90	45,278.5	18	69,118.7	0	.0	1,256	318,214.8
Miscellaneous/Undefined	76	38,200.1	16	8,999.5	21	3,626.7	0	.0	113	50,826.3
Total	73,142	8,483,491.7	14,267	3,141,018.6	40,51	7,381,152.8	5	4,936.9	127,929	19,010,600.0

Source: Treasure Coast Regional Vulnerability Analysis June 2012

Table 4.18 - Damage, Sheltering Requirements, and Economic Loss to St. Lucie County Based on Hurricanes

Quick Assessment Report

April 1, 2016

Study Region : StLucieCounty

Scenario : Probabilistic

Regional Statistics

Area (Square Miles)	576
Number of Census Tracts	44
Number of People in the Region	277,789
General Building Stock	

Occupancy	Building Count	Dollar Exposure (\$ K)
Residential	113,727	25,572,523
Commercial	6,095	3,010,540
Other	3,113	1,639,976
Total	122,935	30,223,039

Scenario Results

Number of Residential Buildings Damaged

Return Period	Minor	Moderate	Severe	Destruction	Total
10	3,125	207	2	0	3,334
20	17,696	2,725	96	40	20,557
50	38,661	15,162	2,527	701	57,051
100	44,038	27,616	7,475	2,538	81,668
200	37,122	36,980	16,980	6,410	97,491
500	26,319	37,225	28,053	14,604	106,201
1000	15,455	34,340	37,835	23,284	110,914

Number of Buildings Damaged

Return Period	Minor	Moderate	Severe	Destruction	Total
10	3,349	239	4	0	3,592
20	18,957	3,182	150	42	22,341
50	40,827	16,953	3,169	723	61,673
100	46,206	30,483	9,392	2,614	88,694
200	38,810	40,041	20,061	6,549	105,460
500	27,273	39,755	32,875	14,947	114,851
1000	16,052	36,443	43,576	23,739	119,809

Shelter Requirements

Return Period	Displaced Households (#Households)	Short Term Shelter (#People)
10	25	6
20	276	59
50	1,398	298
100	5,572	1,257
200	15,886	3,592
500	35,870	9,117
1000	54,458	13,526

Economic Loss (x 1000)

Return Period	Property Damage (Capital Stock) Losses		Business Interruption (Income) Losses
	Residential	Total	
10	116,571	119,751	9,672
20	444,223	486,132	56,979
50	1,813,762	2,067,439	368,343
100	3,832,254	4,693,751	882,359
200	7,401,685	8,770,120	1,486,530
500	11,753,293	14,550,993	2,292,318
1000	16,564,365	19,899,341	2,906,781
Annualized	161,650	189,933	29,664

Disclaimer:

Totals only reflect data for those census tracts/blocks included in the user's study region.

The estimates of social and economic impacts contained in this report were produced using HAZUS loss estimation methodology software which is based on current scientific and engineering knowledge. There are uncertainties inherent in any loss estimation technique. Therefore, there may be significant differences between the modeled results contained in this report and the actual social and economic losses following a specific hurricane. These results can be improved by using enhanced inventory data.

Source: Hazus, 2016

4.1.2.4 Risk Assessment

All communities within St. Lucie County are highly vulnerable to hurricanes, but they are not all vulnerable for the same reasons. The barrier islands, North and South Hutchinson, City of Fort Pierce, St. Lucie Village, and areas along the Inter Coastal waterway and St. Lucie River are highly vulnerable to both wind and storm surge damage from hurricanes.

Inland communities may have less hurricane vulnerability from flooding but have hurricane vulnerability from wind damage due to their older or less substantial type of construction.

St. Lucie County's exposure to hurricanes is high, while the County's hazard history indicates that the probability of future occurrence is low to medium depending on the intensity of the storm.

Other than flooding, impact from tropical storms and hurricanes mitigation is the greatest consideration in mitigation efforts countywide. Public facilities are being hardened or built to withstand greater winds, the need for backup power (generators) is considered for public facilities.

4.1.2.5 Probability

4.1.3 Tornadoes

4.1.3.1 Hazard Identification

A tornado is a violent windstorm characterized by a twisting, funnel-shaped cloud. A tornado's wind speed normally ranges from 40 to more than 300 mph. Waterspouts are weak tornadoes that form over warm water and are most common along the Gulf Coast and the southeastern states. Waterspouts occasionally move inland, becoming tornadoes and causing damage and injuries.

A tornado is a violent windstorm characterized by a twisting, funnel-shaped cloud extending to the ground. It is generated by a thunderstorm or hurricane when cool air overrides a layer of warm air, forcing the warm air to rise rapidly. The most common type of tornado, the relatively weak and short-lived type, occurs in the warm season with June being the peak month. The strongest, most deadly tornadoes occur in the cool season, from December through April. Occasional windstorms accompanied by tornadoes, such as the winter storm of 1993, also are widespread and destructive. The damage from a tornado is a result of the high wind velocity and wind-blown debris.

When a tornado threatens, only a short amount of time is available to make life or death decisions. The National Weather Service (NWS) issues two types of alerts:

- A Tornado Watch means that conditions are favorable for tornadoes to develop; and
- A Tornado Warning means that a tornado has actually been sighted or the Weather Field Office has detected rotation on the radar.

Table 4.19 Enhanced Fujita Tornado Intensity Scale

EF-Scale:	Typical Damage:
EF-0 65-85mph	<u>Light damage.</u> Peels surface off some roofs; some damage to gutters or siding; branches broken off trees; shallow-rooted trees pushed over.
EF-1 86-110mph	<u>Moderate damage.</u> Roofs severely stripped; mobile homes overturned or badly damaged; loss of exterior doors; windows and other glass broken.
EF-2 111-135mph	<u>Considerable damage.</u> Roofs torn off well-constructed houses; foundations of frame homes shifted; mobile homes completely destroyed; large trees snapped or uprooted; light-object missiles generated; cars lifted off ground.
EF-3 136-165 mph	<u>Severe damage.</u> Entire stories of well-constructed houses destroyed; severe damage to large buildings such as shopping malls; trains overturned; trees debarked; heavy cars lifted off the ground and thrown; structures with weak foundations blown away.
EF-4 166-200 mph	<u>Devastating damage.</u> Whole frame houses Well-constructed houses and whole frame houses completely leveled; cars thrown and small missiles generated.
EF-5 >200 mph	<u>Incredible damage.</u> Strong frame houses leveled off foundations and swept away; automobile-sized missiles fly through the air in excess of 100 m (109 yd); high-rise buildings have significant structural deformation; incredible phenomena will occur.
EF No rating	<u>Inconceivable damage.</u> Should a tornado with the maximum wind speed in excess of EF-5 occur, the extent and types of damage may not be conceived. A number of missiles such as iceboxes, water heaters, storage tanks, automobiles, etc. will create serious secondary damage on structures.

Source: Weather Underground, 2015

Historic Events

Florida ranks third in the United States in the number of tornado strikes, and the first in the number of tornadoes per square mile. The odds of a tornado striking any specific point in southeastern Florida are 0.04, or once per 250 years. During the period 1950-1994, 82 Floridians were killed; 1998 was the deadliest with 42 deaths in 4 counties; and the 2007 tornadoes in Central Florida left 21 dead. In 2012, the state of Florida had 48 tornadoes touch-down. St. Lucie County. St. Lucie County has had four confirmed tornado touchdowns since 2011, the latest in 2014.

The National Climatic Data Center (NCDC) <http://www.ncdc.noaa.gov/cdo-web/> indicates that there have been a total of 41 tornado incidents in St. Lucie County since 1953 including funnel clouds and waterspouts. The majority of the events have been FO and F1; however two F2 and two F3 tornadoes have impacted the County. NCDC data also indicate that there have been 27 tornado-related injuries, 2 fatalities and \$4,378,560 in property damage associated with tornado events in the County.

Table 4.20 Recent History of Tornadoes in St. Lucie County

Date	Time	Location	Deaths/ Injuries	Property Damage Estimate	Fujita Scale	Brief Description
08//02/2001	10:30	Western St. Lucie County	None	10,000	EF0	An F0 tornado touched down briefly in a rural area west of Ft. Pierce. The tornado damaged a mobile home, overturned a farm tractor and blew down about 25 citrus trees.
5/14/2002	1600	Western St. Lucie County	None	10,000	EF0	A small F0 tornado touched down briefly in a truck repair facility, damaging the roof of one structure and destroying large awnings attached to the truck garage.
7/27/2002	1500	Fort Pierce	None	100,000	EF1	An F1 tornado touched down in Ft. Pierce and remained nearly stationary for about one minute. It destroyed the service bay roof of a car dealership, and damaged 70 cars.
8/4/2004	1525	Fort Pierce	None	Unknown	EF0	An F0 tornado touched down near Interstate 95 northwest of Ft. Pierce ripping the porch off a house. Funnel clouds were reported with this storm.
5/25/2005	1415	Port St. Lucie	None	Unknown	EFO	A tornado touched down in a residential area near Port St. Lucie, damaging shingles, pool screens and awnings.
7/23/2007	1730	Port St. Lucie	None	Unknown	EF0	Brief touchdown near Florida Turnpike knocking trees down with no structural damage
8/19/2008	1135	White City	None	Unknown	EF0	Rain bands moving on shore from Tropical Storm Fay produced a brief EF0 tornado in Ft. Pierce. The tornado slightly damaged the roof and interior ceiling of a warehouse.
4/26/2011	1805	Western St. Lucie County	None	None	EF0	A citizen in Port St. Lucie observed a funnel cloud which briefly touched down as a landspout tornado in a rural agricultural area west of the city. Several other reports were received of a funnel cloud, including two pilot reports. No damage occurred. Photos and video were obtained of the event

Source: National Climatic Data Center

Table 4.20 – Recent History of Tornadoes in St. Lucie County, continued

Date	Time	Location	Deaths/ Injuries	Property Damage Estimate	Fujita Scale	Brief Description
5/8/2012	1408	White City	None	None	EF0	A thunderstorm intensified along the east coast sea breeze and produced a weak brief EF0 tornado (landspout) in a produce field off of Glades Cut Off Road west of Port St. Lucie. The tornado quickly crossed the road before lifting.
5/28/2012	1358	Port St. Lucie	None	Unknown	EF0	A line of thunderstorms formed along the sea breeze boundary within the far outer circulation of Tropical Storm Beryl. One of the storms produced a brief tornado in Lyngate Park and near the Saint Lucie Medical Center near Port Saint Lucie. Estimated sustained winds were around 65 mph, consistent with low-end EF0 damage. Minor damage was sustained to the roofs of two homes, several fences were knocked over, and a few small trees were downed.
7/17/2012	1422	Lakewood Park	None	Unknown	EF0	The very brief EF0 tornado impacted one condominium building within the Indian Pines Village. The tornado stripped several sections of plywood from one roof of a condo and another unit sustained a small hole in the roof and the front entrance awning was peeled back.
8/15/2015	1256	Indrio	None	None	EF0	A motorist near the intersection of Highway US-1 and Indrio Road in Fort Pierce observed a brief touchdown of a weak landspout/tornado that crossed US-1. No damage was reported and an examination of video relayed via social media suggests maximum winds were below 50 mph.

Source: National Climatic Data Center

4.1.3.2 Vulnerability Assessment

Tornado events can have the following potential impacts within a community:

- Excessive wind;
- Electric power outage;
- Surface and air transportation disruption;
- Telecommunications system outage;
- Human health and safety;
- Psychological hardship; and
- Economic disruption.

Tornadoes and severe thunderstorms can occur anywhere throughout the entire state, and anywhere in the County. As the number of structures and the population increases, the probability that a tornado will cause property damage or human casualties also increases. When compared with other states, Florida ranks third in the average number of tornado events per year. These rankings are based upon data collected for all states and territories for tornado events between the years 1991 and 2010. Source: State of Florida Enhanced Hazard Mitigation Plan

St. Lucie County's vulnerability to tornadoes is compounded by the high concentration of mobile home residents in large mobile home communities. St. Lucie County has a mobile home and recreational vehicle population of approximately 10,202. There are 3,970 mobile home spaces and 1,492 RV spaces within the County. Mobile homes are an affordable form of housing in St. Lucie County. They are distributed throughout the County, in rural as well as urban areas. Although the number of mobile homes within the County has reduced in the last 5 years, as some of the older parks are removing and not replacing homes in them, the mobile home communities still tend to be most vulnerable to tornado activity.

The vast majority of Florida tornadoes are weak. There has never been an F5 tornado documented in Florida – and only 4 F4 tornados (National Weather Service Melbourne, Florida).

Historically, St. Lucie County has mainly had occurrences of a magnitude of an EF-0 or EF-1 tornado and the impacts have been widespread throughout the county.

Light damage. Peels surface off some roofs; some damage to gutters or siding; branches broken off trees; shallow-rooted trees pushed over.

Moderate damage. Roofs severely stripped; mobile homes overturned or badly damaged; loss of exterior doors; windows and other glass broken.

4.1.3.3 Risk Assessment

Historical data indicate the overall hazard ranking of St. Lucie County to tornadoes is low, (State of Florida Enhanced Hazard Mitigation Plan) but some specific communities have a moderate to high vulnerability to this hazard due to the type of construction or numbers of mobile homes (manufactured housing units) within their boundaries.

Because tornado hazards are not linked to geography or geology, it is difficult to determine the probability of future occurrence. However, based on historical data for the State of Florida and St. Lucie County, St. Lucie County would only expect an EF-0 or EF-1 magnitude tornado, however stronger magnitude tornados cannot be ruled out.

4.1.4 Severe Thunderstorms

4.1.4.1 Hazard Identification

A severe thunderstorm is defined as a thunderstorm containing one or more of the following phenomena: hail US quarter size or greater, winds gusting in excess of 58 mph, and/or a tornado (NOAA, NWS, 2014). Severe weather can include lightning, tornadoes, damaging straight-line winds, and large hail. Most individual thunderstorms only last several minutes; however, some can last several hours.

Long-lived thunderstorms are called super cell thunderstorms. A super cell is a thunderstorm that has a persistent rotating updraft. This rotation maintains the energy release of the thunderstorm over a much longer time than typical, pulse-type thunderstorms, which occur in the summer months. Super cell thunderstorms are responsible for producing the majority of severe weather, such as large hail and tornadoes (NOAA, NWS, 2014).

Downbursts also are occasionally associated with severe thunderstorms. A downburst is a strong downdraft resulting in an outward burst of damaging winds on or near the ground. Downburst winds can produce damage similar to a strong tornado. Although usually associated with thunderstorms, downbursts can occur with showers too weak to produce thunder (NOAA, NWS, 2014). Strong squall lines also can produce widespread severe weather, primarily very strong winds and/or microbursts. A squall is a sudden violent gust of wind often with rain or snow.

When a severe thunderstorm approaches, the NWS will issue an advisory. According to NOAA, NWS (2014), two possible advisories are as follows:

- Severe Thunderstorm Watch: Conditions are favorable for the development of severe thunderstorms.
- Severe Thunderstorm Warning: Severe weather is imminent or occurring in the area.

Thunderstorm Hazards (Source: Florida Climate Center)

- 1) **Hail:** is a showery precipitation in the form of irregular pellets or balls of ice more than 5mm in diameter, falling from a cumulonimbus cloud. Hailstones are formed when updrafts carry raindrops up into the highest parts of the cloud and the super-cooled liquid droplets collide. Hail drops back down into the warmer part of the cloud and carried back up, until the internal up and downdrafts can no longer support the size of the hailstone, then it falls to the ground.

Hail size typically refers to the diameter of the hailstones. Since 1957 St. Lucie County has had 61 instances of hailstones of .75 inches in diameter or larger. In May of 2007, 2.75 wide hail fell in the southeastern part of the County.

The potential damage and hailstorm intensity is described H0 to H10 according to the TORRO Hail Storm Intensity Scale. *St. Lucie County could reasonably expect hail up to a size code 5 during a severe thunderstorm, as has occurred.

Table 4.21 TORRO Hailstorm Intensity Scale

Size Code	Maximum Diameter	Description	Typical Damage Impacts
0	5mm	Pea	No damage
1	5 to 15 mm	Mothball	Slight general damage to plants, crops
2	10 to 20 mm	Marble, grape	Significant damage to fruit, crops, vegetation
3	20 to 30 mm	Walnut	Severe damage to fruit and crops, damage to glass and plastic structures, paint and wood scored
4	25 to 40 mm	Pigeon's egg/squash ball	Widespread glass damage, vehicle bodywork damage
5	30 to 50 mm	Golf ball/pullet's egg	Wholesale destruction of glass, damage to tiled roofs, significant risk of injuries
6	40 to 60 mm	Hen's egg	Bodywork of grounded aircraft dented, brick walls pitted
7	50 to 75 mm	Tennis ball/cricket ball	Severe roof damage, risk of serious injuries
8	60 to 90 mm	Large orange/softball	Severe damage to aircraft bodywork
9	75 to 100 mm	Grapefruit	Extensive structural damage. Risk of severe or even fatal injuries to persons caught in the open
10	Over 100 mm	Melon	Extensive structural damage. Risk of severe or even fatal injuries to persons caught in the open

- 2) **Wind:** Damaging winds are more likely to be associated with thunderstorms than tornadoes. In fact, many confuse damage produced by “straight-line” winds and often erroneously attribute it to tornadoes. This occurred in St. Lucie County in March 2015 in the White City area. Several mobile homes were damaged. St. Lucie County could expect to receive up to Force 11 winds during a severe thunderstorm. Wind force scaling is depicted below in **Table 4.22.**

Table 4.22 Beaufort Wind Scale

Force	Wind (Knots)	WMO Classification	Appearance of Wind Effects	
			On the Water	On Land
0	Less than 1	Calm	Sea surface smooth and mirror like	Calm, smoke rises vertically
1	1-3	Light Air	Scaly ripples, no foam crests	Smoke drift indicates wind direction, still wind vanes
2	4-6	Light Breeze	Small wavelets, crests glassy, no breaking	Wind felt on face, leaves rustle, vanes begin to move
3	7-10	Gentle Breeze	Large wavelets, crests begin to break, scattered whitecaps	Leaves and small twigs constantly moving, light flags extended
4	11-16	Moderate Breeze	Small waves 1-4 ft. becoming longer, numerous whitecaps	Dust, leaves, and loose paper lifted, small tree branches move
5	17-21	Fresh Breeze	Moderate waves 4-8 ft taking longer form, many whitecaps, some spray	Small trees in leaf begin to sway
6	22-27	Strong Breeze	Larger waves 8-13 ft, whitecaps common, more spray	Larger tree branches moving, whistling in wires

7	28-33	Near Gale	Sea heaps up, waves 13-20 ft, white foam streaks off breakers	Whole trees moving, resistance felt walking against wind
8	34-40	Gale	Moderately high (13-20 ft) waves of greater length, edges of crests begin to break into spindrift, foam blown in streaks	Whole trees in motion, resistance felt walking against wind
9	41-47	Strong Gale	High waves (20 ft), sea begins to roll, dense streaks of foam, spray may reduce visibility	Slight structural damage occurs, slate blows off roofs
10	48-55	Storm	Very high waves (20-30 ft) with overhanging crests, sea white with densely blown foam, heavy rolling, lowered visibility	Seldom experienced on land, trees broken or uprooted, "considerable structural damage"
11*	56-63	Violent Storm	Exceptionally high (30-45 ft) waves, foam patches cover sea, visibility more reduced	
12	64+	Hurricane	Air filled with foam, waves over 45 ft, sea completely white with driving spray, visibility greatly reduced	

- 3) **Lightning:** Lightning is the most lethal component of the thunderstorm. Perhaps the most dangerous and costly effect of thunderstorms is lightning. As a thunderstorm grows, electrical charges build up within the cloud. Oppositely charged particles gather at the ground below. The attraction between positive and negative charges quickly grows strong enough to overcome the air's resistance to electrical flow. Racing toward each other, the charges connect and complete the electrical circuit. Charge then surges upward from the ground at nearly one-third the speed of light and produces a bright flash of lightning (Cappella, 1997).

While the conditions needed to produce lightning are understood, how lightning forms has never been verified. Forecasters may never be able to forecast when and where a lightning strike will take place.

Florida is the lightning capital of the country, mainly due to our geography. The very elements that make our state a great place for outdoor activities – warm temperatures and plenty of water – also make the environment primed for the production of thunderstorms, which generate lightning.

4.1.4.2 Historic Events

In 1997, thunderstorms spawned 103 tornadoes, injured 121 people, and produced over 38 million dollars in property damage statewide. St. Lucie County averages more than 70 days with thunderstorms per year, with the most frequent occurrences being between the months of July and September.

According to the NCDC, there have been 40 thunderstorm wind incidents in the County since 1975. These incidents caused a total of \$288,000 in property damage.

On average, lightning kills more people than any other weather event. Florida leads in the nation in lightning-related deaths and injuries. Most lightning strike fatalities occur in June, July, and August. Between 1990 and 2003, there were 126 lightning-related deaths in Florida (National Lightning Safety Institute, 2015).

Florida also has the most strikes, about 12 strikes per square kilometer per year in some places (National Lightning Safety Institute, 2015). Nationwide, lightning-related economic losses amount to over \$5 billion dollars per year, and the airline industry alone loses approximately \$2 billion a year in operating costs and passenger delays from lightning (National Lightning Safety Institute, 2015). Florida is the "Lightning Capital of the United States". Lightning occurs with every thunderstorm and, on average, Florida sees around 70-100 days a year with at least one thunderstorm in the state. Florida averages about 10 deaths and 40 injuries directly due to lightning each year.

Between 1950 and 2016, St. Lucie County recorded 8 lightning-related deaths and 13 injuries (National Climatic Data Center, NWS Melbourne). 35% of brush fires in St. Lucie County from 2011 to 2015 were caused by lightning strikes resulting in nearly 1,000 acres being burned.

Lightning incidences in St. Lucie County that have caused injuries, death or property damage can be found in **Table 4.23** on the next page.

Table 4.23 Historic Lightning incidents causing death, injury or damage:

Date	Time	Location	Deaths	Property Damage	Brief Description
05/30/1963	Unknown	Not Specified	1 Dead	Unknown	No details
06/09/1964	Unknown	Not Specified	1 Dead	Unknown	Person on horse
07/22/1965	Unknown	Fort Pierce	1 Dead	Unknown	Person on horse
07/23/1967	Unknown	Lakewood Park	1 Dead	Unknown	Man killed while pulling boat from a lake
09/09/1968	Unknown	Not Specified	1 Dead	Unknown	Grove worker killed while in a tree
09/05/1976	Unknown	Not Specified	1 Dead	Unknown	Girl killed under large oak tree in her yard
05/22/1984	Unknown	Not Specified	1 Dead	Unknown	Grove worker open field
04/20/1989	Unknown	Not Specified	2 Injured	Unknown	2 golfers injured while retrieving a ball from a pond
08/01/1997	1530	St. Lucie County International	1 Injured	\$0	A man injured while standing in an open area of the Airport
08/03/1998	2140	8700 Orange Ave, Fort Pierce	None	\$20,000	Lightning struck natural gas pipeline causing an explosion
06/11/1999	1230	Hutchison Island	2 Injured	0	Father and daughter injured while under a large tree
09/25/2003	1320	Not Specified	1 Injured	0	Utility worker injured while working in basket of utility truck

Source: National Climatic Data Center, NWS Melbourne

Although likely, there is no documentation of lightning strikes that have caused injuries, death or property damage in St. Lucie County since 2003.

4.1.4.3 Vulnerability Assessment

Thunderstorm events can have the following potential impacts within a community:

- Excessive wind;
- Excessive water;
- Damaging hail;
- Electric power outage;
- Surface and air transportation disruption;
- Telecommunications system outage;
- Human health and safety;
- Psychological hardship;
- Economic disruption;
- Fire; and
- Storm water drainage impairment.

Vulnerability to severe thunderstorms and lightning is high in St. Lucie County, but many of the jurisdictions and population centers have only moderate vulnerabilities relative to these hazards. This variation in relative levels of vulnerability is again due primarily to construction practices and community characteristics. Working communities have a higher vulnerability to economic impacts by lightning than residential or retirement communities, all other factors being equal, while residential and retirement communities have a historically higher vulnerability in terms of lightning fatalities.

Lightning strikes are capable of causing intense localized damage, as well as loss of life. In contrast to other hazards such as tornadoes and floods; however, they normally do not cause widespread disruptions within a community. Fire, structural damage to buildings, and damage to electronic devices are common types of damage. An estimated 5% of all homeowners' insurance claims are related to lightning damage. Farmers face these same threats plus the threat to livestock. In stormy weather, livestock frequently gather under trees to seek shelter or are trapped in barns where a lightning strike can destroy an entire herd.

4.1.4.4 Risk Assessment

The National Lightning Detection Network's Vaisala map indicated that St. Lucie County lightning strike density is greater in the western two thirds (20-28 per square mile or between 4571 & 7619 per year) of the county than the eastern one third (12-20 per square mile, between 3810 & 5134 per year). This would indicate that St. Lucie County, with 572 square miles over all could average 8,008 lightning strikes per year, if the 70-100 days a year of severe thunderstorms in the State impact St. Lucie County.

Since 1953 there have been 41 thunderstorm high wind events and 39 hail events totaling approximately \$308,500 in damages. That amount may be conservative due to inconsistent damage reporting.

Working communities have a higher vulnerability to economic impacts by lightning than residential or retirement communities, all other factors being equal, while residential and retirement communities have a historically higher vulnerability in terms of lightning damages.

At the time of publication, a risk assessment model for severe thunderstorms was not available. The County can expect losses similar to what it experienced in the past. The most vulnerable areas in St. Lucie County would be open areas such as the shoreline, golf courses, beaches, open fields and parks. This vulnerability is increased because these areas are where large populations congregate. There could also be a significant loss of life as well as economic impacts to transportation systems, tourism, etc. The probability of future thunderstorms with winds, hail, and lightning occurrence based on hazard history is high. According to the Florida Climate Center <http://climatecenter.fsu.edu/> Florida has 100 days of thunderstorms annually.

4.1.5 Wildland Fire

4.1.5.1 Hazard Identification

Florida's population has nearly tripled in the last century, and much of the growth has occurred in the undeveloped areas. The trend has created a complex landscape known as the Wildland/Urban Interface, a set of conditions under which wildland fires move beyond trees and undergrowth to threaten neighborhoods. Ensuring a home is compatible with nature can help save it and the entire community when wildfire strikes.

Florida's wildfire season is twelve months long. Saint Lucie County has wildfires throughout the year. The most active part the year is typically December through the beginning of June. Generally, Saint Lucie County experiences the greatest number of wildfires during April, May, and June. On average, Saint Lucie County has 28 wildfires a year depending on weather conditions. Refer to table A and B for details by cause and year.

South Florida has several areas of spot building where homes are built in neighborhoods with large, unmanaged properties nearby where little or no regular landscape maintenance is conducted. Local governments often require neighborhoods to maintain designated preserves or conservation areas where plants and wildlife must remain untouched.

Work in the preserves is often restricted to minimize the impacts for wildlife and native vegetation. Yet these preserves must still be managed. Fire plays an important role because Florida plants and animals rely on it.

If the conservation areas are left unmanaged the accumulation of dead fuels and untreated new growth can create an undesirable effect, such as extreme fire behavior and habitat loss for the wildlife. Regular maintenance of preserves improves the chances for new growth. Otherwise, dead vegetation accumulates and causes fire danger to increase. These unmanaged areas force animals to forage outside their normal habitat. Regular food supplies run low for gopher tortoises and other species that rely on periodic fire to burn off the excess vegetation often found in these preserves.

Large undeveloped properties owned by city, county, state agencies might have set these areas as preserves or natural areas. A management plan is needed to reduce the hazardous buildup of dead vegetation. The Florida Forest Service continues to work together with municipalities in Saint Lucie County to educate and facilitate mitigation in identified high risk areas.

Historic Events

April 15, 1999. The worst fire in St. Lucie County started as a small brush fire in western Port St. Lucie. The fire burned nearly 2,400 acres, destroyed nearly 50 homes, and damaged 30 others with damages estimated at \$7.3 million. This disaster received a Federal Disaster Declaration

Table 4.24 Recent Significant Wildfires in St. Lucie County

Wildfire Name	Date	Homes threatened	Location	Acres	Cause
Russakis	6/18/2015	4	5501 Emerson	42	powerlines
Savannas	6/11/2014	2 pavilions	Savannas preserve State Park	57.5	Escaped Prescribed Fire
Slash Pine	5/28/2014	10	Tree top trail off Indio in Ft Pierce	10 acres	Debris Burn
Canal Road	02/18/2014	3 pump houses damaged	Bluefield and Germany Canal Rd	211	Incendiary
Heather	3/24/2013	244	Indrio & US1	390	Lightning
Oleander Command	4/3/2012	1	Oleander	1.5	Campfire
Orange	2/17/2011	0	Carlton Road	240	Debris Burning
Midway Command	3/24/2011	5	Midway & US1	40	
Lewis	6/14/2011	0	Edwards & Lewis	23	Lightning
Del Mundo	5/9/2010	3	240 Del Mundo St	300	Children

Source: Florida Forest Service

Table 4.25 - Saint Lucie County's Five Year Wildfire History

Year	Number of Wildfires	Acres Burned
2015	49	801
2014	19	250.3
2013	25	402.2
2012	22	376.4
2011	26	172.3

Source: Florida Forest Service

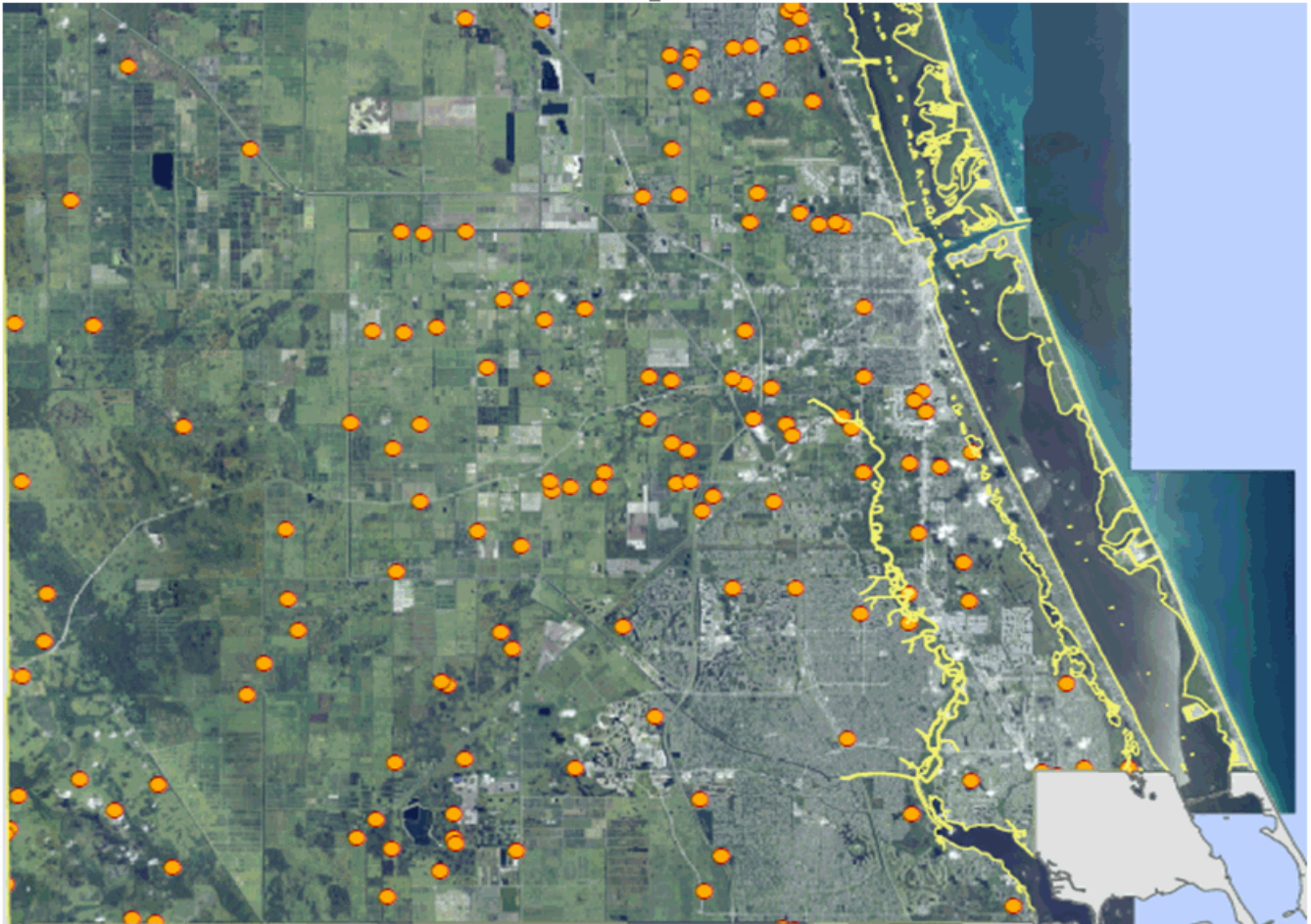
Table 4.26 - Saint Lucie County's Five Year Wildfire Causes (2011-2015)

St. Lucie

Cause	Fires	Percent	Acres	Percent
Campfire	7	4.96	10.6	0.53
Children	4	2.84	2.6	0.13
Debris Burn*	0	0	0.0	0
Debris Burn-- Auth--Broadcast/Acreage	7	4.96	330.7	16.52
Debris Burn-- Auth--Piles	8	5.67	25.1	1.25
Debris Burn-- Auth--Yard Trash	0	0	0.0	0
Debris Burn-- Nonauth--Broadcast/Acreage	2	1.42	1.5	0.07
Debris Burn-- Nonauth--Piles	1	0.71	1.0	0.05
Debris Burn-- Nonauth--Yard Trash	2	1.42	3.0	0.15
Equipment use*	0	0	0.0	0
Equipment--Agriculture	5	3.55	10.1	0.50
Equipment--Logging	0	0	0.0	0
Equipment--Recreation	1	0.71	2.0	0.10
Equipment--Transportation	6	4.26	81.7	4.08
Incendiary	6	4.26	220.0	10.99
Lightning	50	35.46	979.6	48.93
Miscellaneous --Breakout	0	0	0.0	0
Miscellaneous --Electric Fence	0	0	0.0	0
Miscellaneous --Fireworks	1	0.71	0.3	0.01
Miscellaneous --Power Lines	14	9.93	57.8	2.89
Miscellaneous --Structure	0	0	0.0	0
Miscellaneous--Other	6	4.26	39.8	1.99
Railroad	1	0.71	0.1	0.00
Smoking	2	1.42	0.2	0.01
Unknown	18	12.77	236.1	11.79
Total	141		2,002.2	

Source: Florida Forest Service

Figure 4.7 St. Lucie County Wildfires 2011-2015



Source: Florida Forest Service

Risk Assessment

Low Wildfire Hazard -Homes are built with concrete and appropriate non-flammable roofing materials. Short grass, low shrubs and light duff are present. The forest and heavy vegetation are not continuous throughout the community. Wildfires that do occur in these areas are less intense and easier to suppress because of the lower volume of fuel to feed and sustain the fire. (City of Fort Pierce, Ankona, Eden, Eldred)

Medium Wildfire Hazard - Wildland vegetation is continuous throughout the community. Tall grass, medium shrubs, thick duff and ladder fuels are prominent in the area. Vegetation is less than 30 feet from homes. Homes are built with vinyl, plastic or other types of less fire-resistant materials. Access is limited and the concentration of fuel to feed fires causes more intense fire behavior. Fire suppression becomes more difficult and costly. (City of Port St. Lucie, Village of St. Lucie, River Park, Fort Pierce North & South, Hutchinson Island North & South, Lakewood Park, River Park)

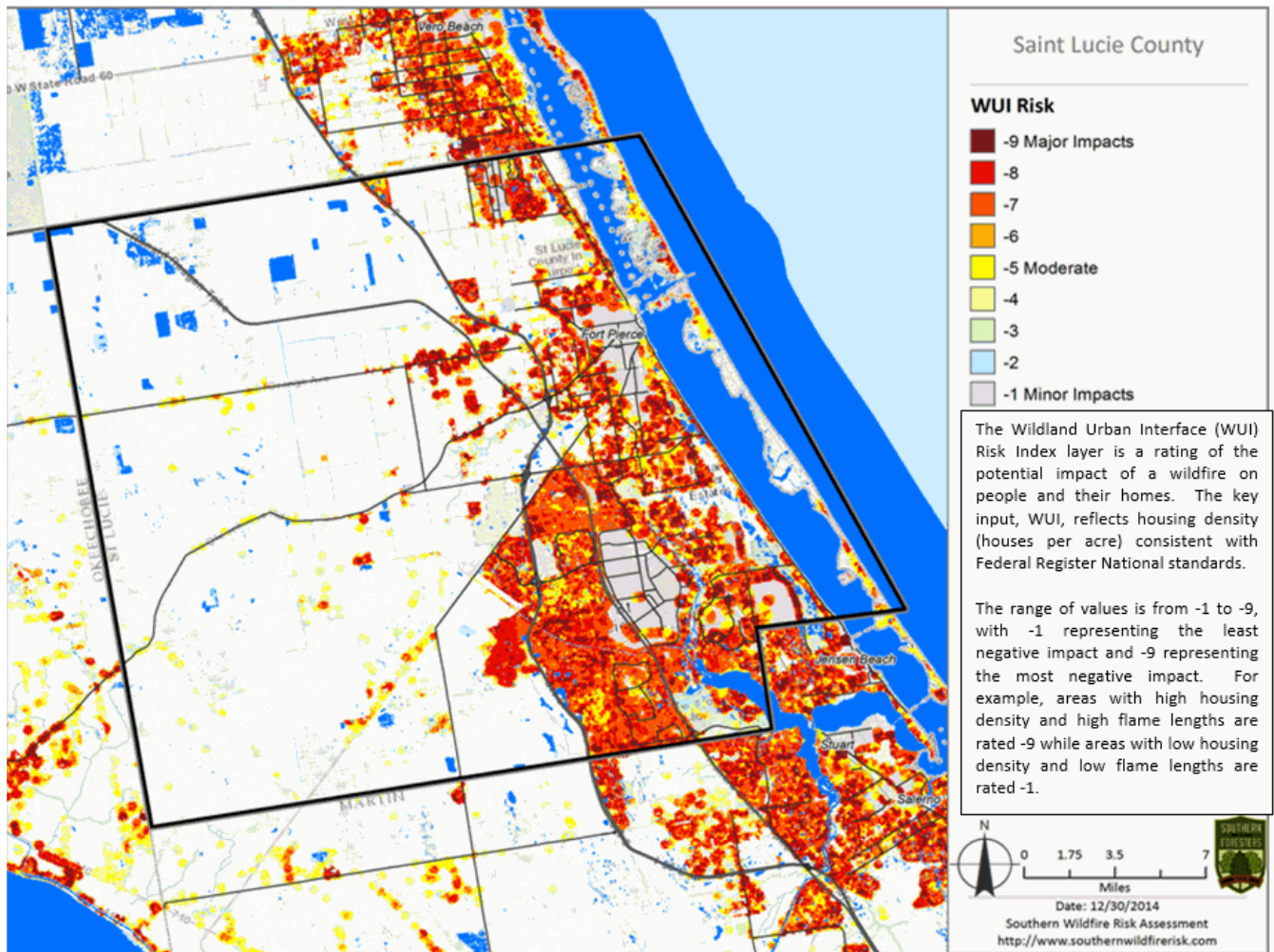
High Wildfire Hazard -Dense, highly flammable vegetation surrounds the neighborhood and is within a few feet of homes. A thick layer of vegetation is present on the forest floor. Access to the neighborhood is limited to one entrance and/or on poorly maintained roads. Homes are rarely built with fire-resistant materials. Continuous, overgrown vegetation limits access and creates intense wildfire conditions. Fire suppression is challenging and requires more resources (engines, dozers, and aircraft) and firefighters than normal. (Walton, White City, Indian River Estates, Savanna Club, PGA Village, Spanish Lakes)

There are three Firewise Communities in Saint Lucie County (Savanna Club, PGA Village, Indian River Estates & Walden Woods) These communities are aware of their wildfire risk and take action to reduce their risk. Learn more www.Firewise.org

The Wildland Urban Interface (WUI) Risk Index layer is a rating of the potential impact of a wildfire on people and their homes. The key input, WUI, reflects housing density (houses per acre) consistent with Federal Register National standards.

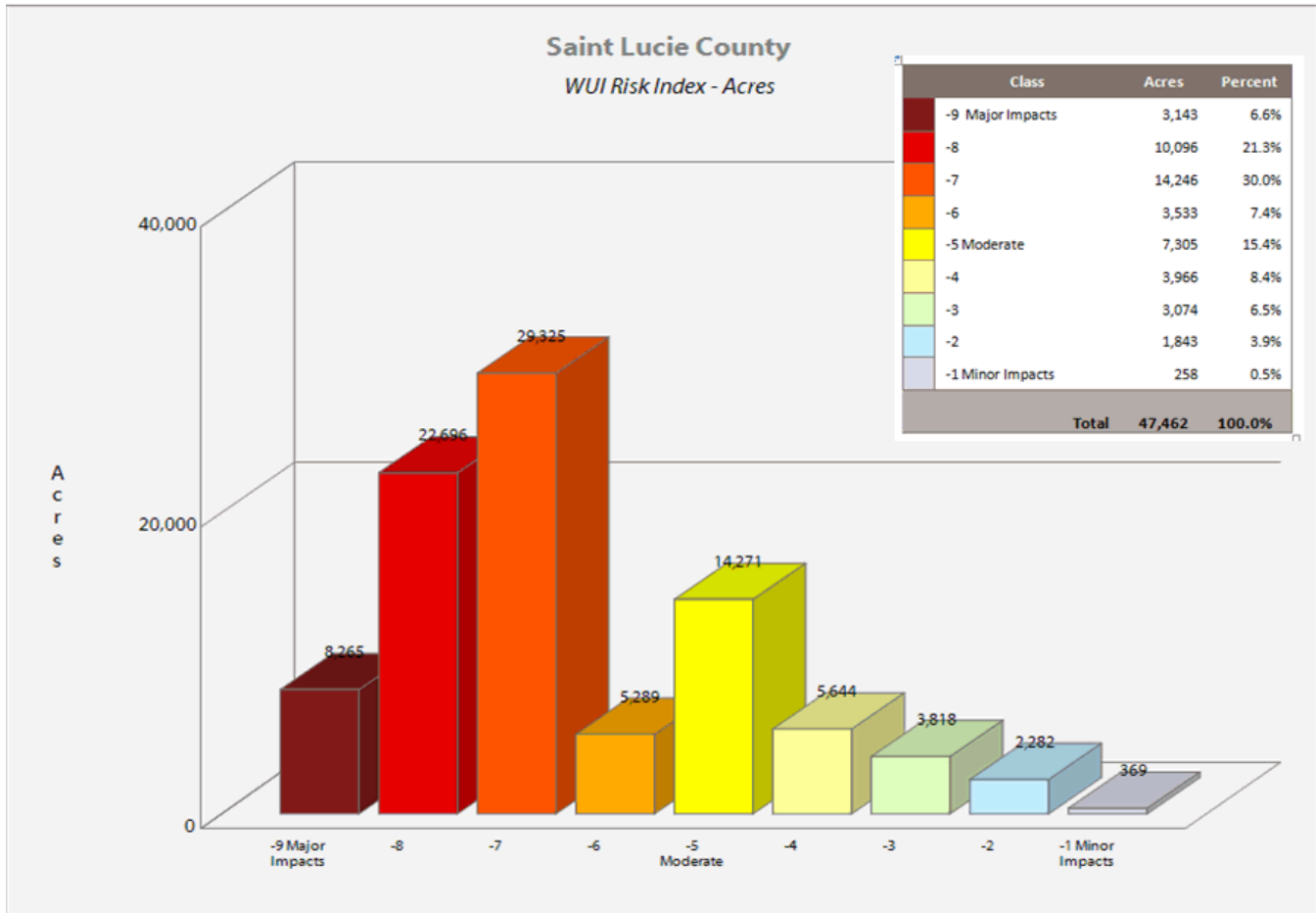
The range of values is from -1 to -9, with -1 representing the least negative impact and -9 representing the most negative impact. For example, areas with high housing density and high flame lengths are rated -9 while areas with low housing density and low flame lengths are rated -1. A map of the WUI Risk Index for St. Lucie County can be found in **Figure 4.8** on the next page.

Figure 4.8 St. Lucie County WUI Risk Index Map



Source: Florida Forest Service

Table 4.27 St. Lucie County WUI Risk Index - Acres

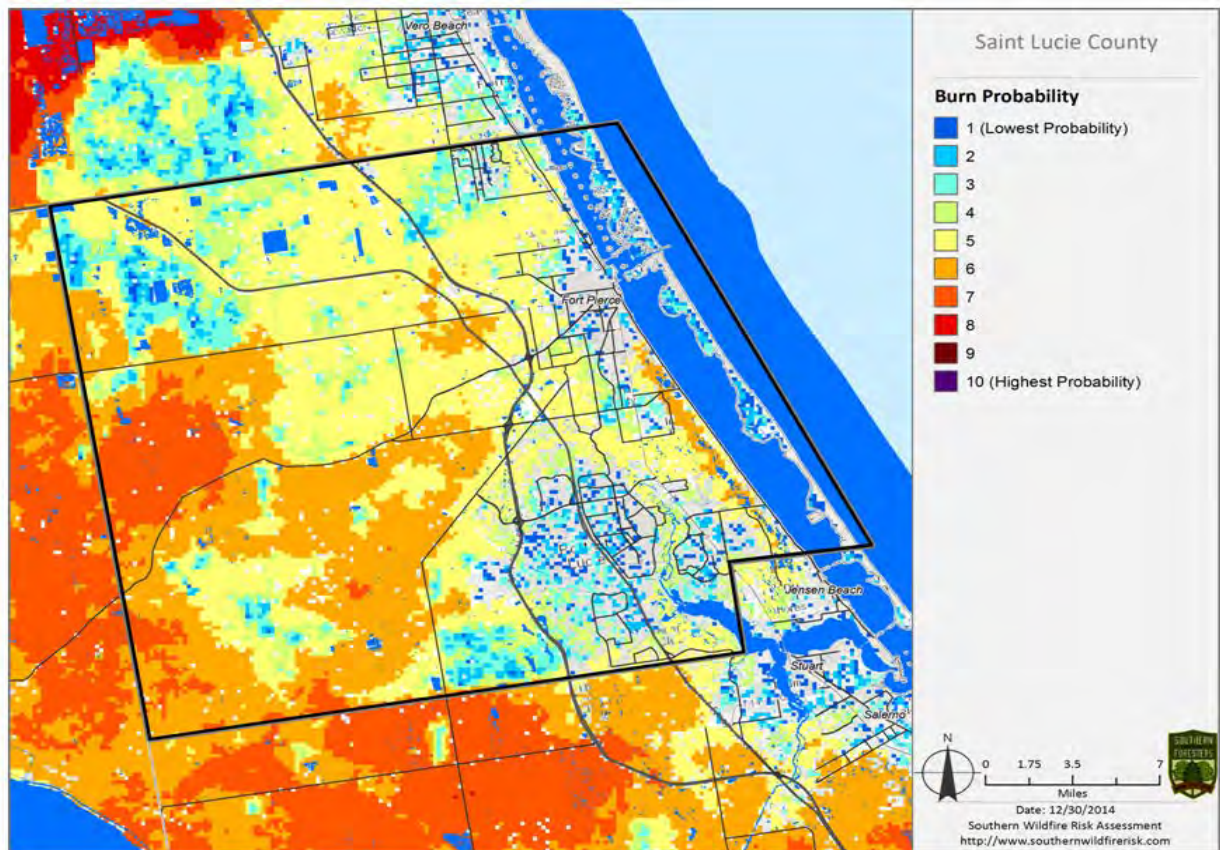


Source: Florida Forest Service

According to the US Forest Service, burn probability is determined by modeling is based on components of fire regimes (spatial ignition, and fire weather conditions) on landscape of known fuels and topography. Bur probability varies considerably throughout the County and is susceptible to change due to weather conditions.

The Burn Probability Map for St. Lucie County is located in **Figure 4.9** on the next page.

Figure 4.9 St. Lucie County Burn Probability Map



Source: Florida Forest Service

Vulnerability Assessment

Wildland fires can have the following potential impacts within a community:

- Lives & Property Loss
- Electric power outage;
- Surface and air transportation disruption;
- Telecommunications system outage;
- Human health and safety;
- Psychological hardship;
- Economic disruption;
- Disruption of community services;
- Agricultural/fisheries damage;
- Loss of livestock;
- Damage to critical environmental resources;
- Damage to identified historical resources

4.1.6 Erosion

4.1.6.1 Hazard Identification

Beach Erosion

Beach erosion is the wearing away of land and the removal of beach or dune sediments by wave action, tidal currents, wave currents, drainage or high winds. The wave climate impacting St. Lucie County's miles of shoreline has contributed to the long term erosion of the County's barrier islands. As a result, the Florida Department of Environmental Protection (FDEP) has concluded that 18 miles of shoreline is "critically eroded". A critically eroded area is defined by FDEP as a segment of the shoreline where natural processes or human activity has caused or contributed to erosion and recession of the beach or dune system to such a degree that upland development, recreational interests, wildlife habitat, or important cultural resources are threatened or lost. To assist with its coastal management strategies and long term sustainability of its shoreline, the County has developed and adopted a Beach Preservation Plan (BPP), updated 2014. The BPP identifies the current shoreline conditions and provides cost effective strategies for future beach management along the County's shoreline in particular the FDEP classified critically eroded areas.

Wind, waves, and longshore currents are the driving forces behind coastal erosion. This removal and deposition of sand permanently changes beach shape and structure. Most beaches, if left alone to natural processes, experience natural shoreline retreat. As houses, highways, seawalls, and other structures are constructed on or close to the beach, the natural shoreline retreat processes are interrupted. The beach jams up against these man-made obstacles and narrows considerably as the built-up structures prevent the beach from moving naturally inland. When buildings are constructed close to the shoreline, coastal property soon becomes threatened by erosion. The need for shore protection often results in "hardening" the coast, with a structure such as a seawall or revetment.

A seawall is a large concrete wall designed to protect buildings or other man-made structures from beach erosion. A revetment is a cheaper option constructed with "rip rap" such as large boulders, concrete rubble, or even old tires. Although these structures may serve to protect beachfront property for a while, the resulting disruption of the natural coastal processes has serious consequences for all beaches in the area. Seawalls inhibit the natural ability of the beach to adjust its slope to the ever-changing ocean wave conditions. Large waves wash up against the seawall and rebound back out to sea carrying large quantities of beach sand with them. With each storm, the beach narrows, sand is lost to deeper water, and the long shore current scours the base of the wall. Eventually, large waves impact the seawall with such force that a bigger structure becomes necessary to continue to resist the forces of the ocean.

DEP has identified St. Lucie County as a medium-high risk to erosion. The beaches of Florida will continue to shift and change over time, especially when faced with the current levels of development. This is especially a high probability hazard, especially in conjunction with hurricanes, winter storms, and coastal flooding.

4.1.6.2 Previous Occurrences of Beach Erosion

There have been several beach restoration projects in St. Lucie County spanning 30 years. Between 2004 and 2015; Hurricanes Frances (2004), Jeanne (2004), and Wilma (2005), Hurricane Isaac and Hurricane Sandy (2012) caused considerable beach erosion. A re-nourishment project in-progress in the south end of South Hutchinson Island was destroyed by Hurricane Sandy in 2012.

4.1.6.3 Vulnerability Assessment

Erosion can have the following potential impacts within a community:

- Soil/beach erosion;
- Navigable waterway impairment;
- Economic disruption;
- Damage to critical environmental resources; and
- Stormwater drainage impairment.

St. Lucie County's vulnerability to soil collapse and beach erosion is moderate along its entire coastline. The most significant area of beach erosion in the County is along Fort Pierce Beach, immediately south of the Fort Pierce Inlet. This area has just been the subject of a major beach re-nourishment project sponsored jointly by the County and U.S. Army Corps of Engineers. Other beachfront communities report low to moderate erosion problems. Erosion also is a potential vulnerability for the communities located on both the Indian River and the North Fork of the St. Lucie River..

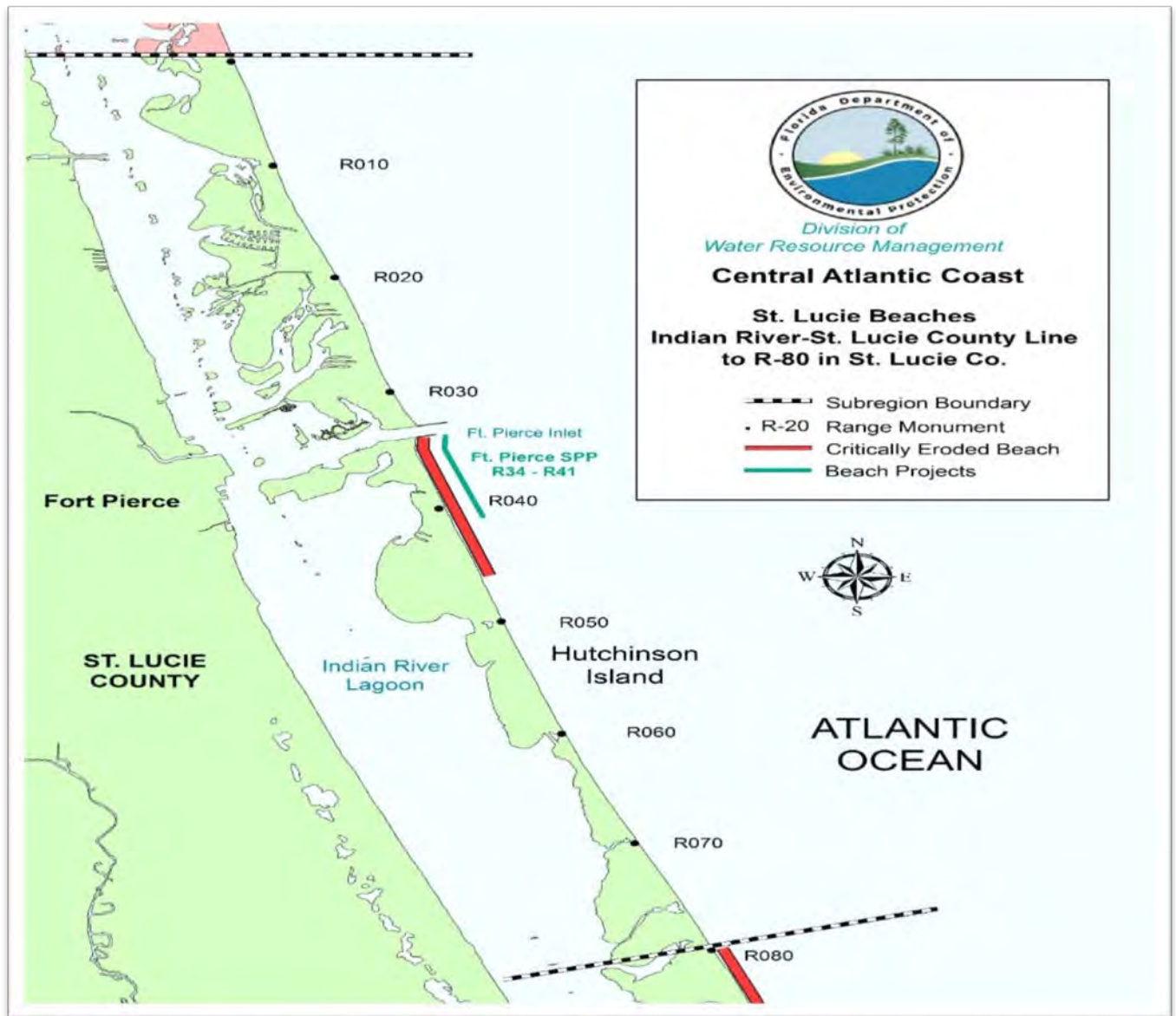
4.1.6.4 Risk Assessment

FDEP's Strategic Beach Management Plan for the Central Atlantic Coast region updated a statewide assessment of beach erosion in June, 2009. In that assessment, FDEP defined the "critical erosion area" as a segment of shoreline where natural processes or human activity have caused or contributed to erosion and recession of the beach or dune system to such a degree that upland development, recreation interests, wildlife habitat, or important cultural resources are threatened or lost. Critically eroded areas may also include peripheral segments or gaps between identified critically eroded areas which, although they may be stable or slightly erosional now, their inclusion is necessary for continuity of management of the coastal system or for the design integrity of adjacent beach management projects (FDEP, 2009).

Figure 4.8 shows the only critical erosion area (R040) in St. Lucie County as of 2015. R040 extends south from the Fort Pierce Inlet 1.3 miles, threatening recreation and development interests. This area is currently undergoing re-nourishment in a joint project between the County, City of Fort Pierce, Florida Inland Navigation District and the US Army Corps of Engineers. The budget for this project is \$5.2 million dollars. The southern 3.4 miles of the County shoreline (R070) was under a re-nourishment project when Hurricane Sandy eroded the work that had been done. This project cost 2.96 million. A map of St. Lucie County critically eroded beaches is depicted in **Figure 4.10** on the next page.

Beach erosion

Figure 4.10 Map of St. Lucie County Critically Eroded Beaches



Source: Florida DEP

The probability of beach erosion in St. Lucie County is high: Coastal erosion is continual and is exacerbated by tropical storms, winter storms, and hurricanes. It is anticipated there will be at least one storm event on an annual basis that will contribute to erosion.

4.2 OTHER NATURAL HAZARDS

4.2.1 Extreme Temperatures

4.2.1.1 Freezing Temperatures

Hazard Identification

A freeze is defined by the National Weather Service (NWS) as when the surface air temperature is expected to be 32 degrees or below over a widespread area for a climatologically significant period of time. The NWS issues a freeze warning when surface temperatures are expected to drop below freezing over a large area for an extended period of time, regardless of whether or not frost develops.

According to the Department of Agriculture and Consumer Services, a moderate freeze may be expected every 1 to 2 years. Severe freezes may be expected on an average of once every 15 to 20 years. Freezes pose a major hazard to the agriculture industry in St. Lucie County on a recurring basis and are a significant threat to the economic vitality of the State's agriculture industry. Agricultural lands represents nearly one-half of all land in St. Lucie County (University of Florida, 2001).

Historic Events

Florida has experienced a number of severe or disastrous freezes, where the majority of the winter crops were lost. The lowest temperature ever recorded in the state of Florida is -2°F in Tallahassee on February 13, 1899 (Florida Department of Emergency Management, 2012). At the same time, snow up to three inches deep was reported by several cities in the Panhandle. Since December 1889, there have been at least 22 recorded severe freezes; the most recent being in 1996, when a Presidential Disaster Declaration was issued for crop losses exceeding \$90 billion. During this event, there was extensive loss of citrus trees, and the majority has not been replanted. Freezes in January of 1977 had severe impacts on agriculture around the state. A U.S. Department of Agriculture report indicated the following crop loss: citrus - 35%, vegetables - 95-100%, commercial flowers - 50-75%, permanent pasture land - 50%, and sugar cane - 40%. In addition, there was a severe loss to the tropical fish industry. It is estimated that the freeze cost the Florida economy \$2 billion in 1977 dollars (National Weather Service, 1999a). St. Lucie County has experienced seven significant freezes between 1970 and the present. None since 2010.

4.2.1.2 Extreme Heat

Hazard Identification

Temperatures that are 10° or more above the average high temperature for a region and last for several weeks are defined as extreme heat (FEMA, 2003). Humid conditions, which add to the discomfort of high temperatures, occur when an area of high atmospheric pressure traps hazy, damp air near the ground.

A heat wave is an extended period of extreme heat, and is often accompanied by high humidity (FEMA Ready, 2015). Humid conditions, which add to the discomfort of high temperatures, occur when an area of high atmospheric pressure traps hazy, damp air near the ground.

Human bodies dissipate heat in one of three ways: by varying the rate and depth of circulation; by losing water through the skin and sweat glands; and by panting. As the blood is heated to above 98.6°, the heart begins to pump more blood, blood vessels dilate to accommodate the increased flow, and the bundles of tiny capillaries penetrating through the upper layers of skin are put into operation. The body's blood is circulated closer to the surface, and excess heat is released into the cooler atmosphere. At the same time, water diffuses through the skin as perspiration. The skin handles about 90% of the body's heat dissipating function.

Heat disorders generally have to do with a reduction or collapse of the body's ability to cool itself by circulatory changes and sweating, or a chemical (salt) imbalance caused by too much sweating. When the body cannot cool itself, or when it cannot compensate for fluids and salt lost through perspiration, the temperature of the body's inner core begins to rise and heat-related illness may develop. Studies indicate that, other things being equal, the severity of heat disorders tend to increase with age. Heat cramps in a 17-year old may be heat exhaustion in a 40-year old, and heat stroke in a person over 60.

When the temperature gets extremely high, the NWS has increased its efforts to alert the general public as well as the appropriate authorities by issuing Special Weather Statements. Residents should heed these warnings to prevent heat-related medical complications:

Excessive Heat Watch - Conditions are favorable for an excessive heat event to meet or exceed local Excessive Heat Warning criteria in the next 24 to 72 hours.

Excessive Heat Warning - Heat Index values are forecast to meet or exceed locally defined warning criteria for at least 2 days (daytime highs = 105-110° Fahrenheit).

Heat Advisory - Heat Index values are forecast to meet locally defined advisory criteria for 1 to 2 days (daytime highs = 100-105° Fahrenheit).

As a result of the latest research findings, the NWS has devised the "Heat Index" (HI). The HI, given in degrees Fahrenheit, is an accurate measure of how hot it really feels when relative humidity is added to the actual air temperature. The NWS will initiate alert procedures when the H I is expected to exceed 105°F for at least two consecutive days. Possible heat disorders related to the corresponding HI are listed below.

- Human health and safety;
- Psychological hardship;
- Economic disruption;
- Agricultural/fisheries damage; and
- Damage to critical environmental resources.

Table 4.28 Heat Index Chart

Classification	Heat Index	Effects on the body
Caution	80°F - 90°F	Fatigue possible with prolonged exposure and/or physical activity
Extreme Caution	90°F - 103°F	Heat stroke, heat cramps, or heat exhaustion possible with prolonged exposure and/or physical activity
Danger	103°F - 124°F	Heat cramps or heat exhaustion likely, and heat stroke possible with prolonged exposure and/or physical activity
Extreme Danger	125°F or higher	Heat stroke highly likely

Source: NOAA, 2014

Historic Events. The hottest temperature ever recorded in Florida was 109°F on June 29, 1931, in Monticello, Florida (Florida Department of Emergency Management, 2012). In a normal year, approximately 175 Americans die from extreme heat. However, in 2013, the death toll was 92 (National Weather Service, 2014).

Temperature extremes, both freezes and periods of excessive heat impact communities with a larger population of older people to a greater extent than those with younger populations. According to the 2013 Census, 28.8% of residents in St. Lucie County are over the age of 65. Freezing conditions primarily affect agriculture and homeless indigents. When conditions are predicted to be below freezing, shelters are opened. As stated earlier, nearly one-half of land in St. Lucie County is currently designated agricultural land. A survey of the County's homeless population was conducted in 2002, indicating that there are approximately 759 homeless individuals within the County (Florida Department of Children and Families, 2006).

Inland communities away from the moderating influence of the ocean or the estuary are more vulnerable to temperature extremes as are areas with significant agricultural assets. According to the National Weather Service, between 1979 and 1999, there have been 249 extreme temperature-related deaths in the state. This number is greater than the number of deaths caused by hurricanes, tornadoes, and lightning combined.

4.2.1.3 Risk Assessment

At the time of publication, no model was available to determine potential loss in St. Lucie County due to extreme temperatures. The best datum available to estimate potential loss for freezing temperatures is the market value of production in St. Lucie County, which in 2007 totaled \$165,000,000.

4.2.2 Drought

4.2.2.1 Previous Occurrences of Drought

Rainfall patterns vary greatly both seasonally and annually in Florida. Therefore, periods of low rainfall are a common occurrence but still may have significant impacts. This especially can be the case if there are several periods of low rainfall in the same year or series of years. Based on daily rainfall records from the Indian River Research and Education Center at Fort Pierce from 1953-2002, periods of 3 weeks or more with cumulative rainfall of less than 0.25, 0.50, and 1.0 inches were identified by researchers from the University of Florida. There have been seven occurrences since 1953 where there were periods of 6 or more weeks with less than 0.25 inch of cumulative rainfall and 33 periods of 4 or more weeks with less than 0.25 inch. There also have been 34 periods of 4 or more weeks with less than 0.50 inch of rain and 52 periods with less than 1.0 inch. Any of these periods could potentially occur again. These periods of drought frequently coincided with the season of late March to mid-October, when citrus crops require intense irrigation.

Utilizing the Palmer Drought Severity index, St. Lucie County has had 27 totaling droughts ranging from Mild to Extreme since 2000. The worst drought (Extreme), occurred from May 1, 2011 until October 2011. The longest drought period was 19 months from August 1, 2006 through February 28, 2008. This drought ranged in severity from Mild to Severe. The last drought was from March 1, 2012 to May 1, 2012 and was classified as Mild.

Footnote National Drought Mitigation Center, University of Nebraska, Lincoln

4.2.2.2 Hazard Identification

Drought is a normal, recurrent feature of climate, although many perceive it as a rare and random event. In fact, each year some part of the U.S. has severe or extreme drought. Although it has many definitions, drought originates from a deficiency of precipitation over an extended period of time, usually a season or more (National Drought Mitigation Center, 2015). It produces a complex web of impacts that spans many sectors of the economy and reaches well beyond the area producing physical drought. This complexity exists because water is essential to our ability to produce goods and services (National Drought Mitigation Center, 2015).

A few examples of direct impacts of drought are reduced crop, range-land, and forest productivity; increased fire hazard; reduced water levels; increased livestock and wildlife mortality rates; and damage to wildlife and fish habitat. Social impacts include public safety, health, conflicts between water users, reduced quality of life, and inequities in the distribution of impacts and disaster relief. Income loss is another indicator used in assessing the impacts of drought; reduced income for farmers has a ripple effect throughout the region's economy (National Drought Mitigation Center, 2015).

In St. Lucie County, the primary sources of water are watershed areas, Lake Okeechobee, and the County's well fields. Excess water from an interconnected series of lakes, rivers, canals, and marshes flows either north to the St. Johns River or east to the Indian River Lagoon.

When this cycle is disrupted by periods of drought, one of the potentially most damaging effects is substantial crop loss in the western agricultural areas of the County. In addition to obvious losses in yields in both crop and livestock production, drought in St. Lucie County is associated with increases in insect infestations, plant disease, and wind erosion. The incidence of forest fires increases substantially during extended droughts, which in turn places both human and wildlife populations at higher levels of risk.

The South Florida Water Management District and County staff manage the County's water resources. Complementing the District's water management efforts during periods of critical water shortage, a countywide, uniform, forceful, contingency plan is in place to effectively restrict the use of water.

4.2.2.3 Vulnerability Assessment

While St. Lucie County is moderately vulnerable to impacts from drought due to the County's large agricultural land tax base, some communities are less vulnerable due to their location and non-agricultural economic base. One population center, the Jensen Beach area, is particularly vulnerable because of its water supply.

Drought can have the following potential impacts within a community:

- Economic disruption;
- Agricultural/fisheries damage;
- Damage to critical environmental resources; and
- Fire.

4.2.2.4 Risk Assessment

The Palmer Drought Index has become the semi-official drought index. It is most effective in determining long term drought—a matter of several months—and is not as good with short-term forecasts (a matter of weeks). It uses a 0 as normal, and drought is shown in terms of minus numbers; for example, minus 2 is moderate drought, minus 3 is severe drought, and minus 4 is extreme drought. The Palmer Index can also reflect excess rain using a corresponding level reflected by plus figures; i.e., 0 is normal, plus 2 is moderate rainfall, etc.

Another reference tool is the Keetch-Byram drought index (KBDI), which is a continuous reference scale for estimating the dryness of the soil and duff layers. The index increases for each day without rain (the amount of increase depends on the daily high temperature) and decreases when it rains. The scale ranges from 0 (no moisture deficit) to 800 (prime drought condition). The range of the index is determined by assuming that there is 8 inches of moisture in a saturated soil that is readily available to the vegetation.

At the time of publication, no model was available to determine the potential loss associated with drought in St. Lucie County. The best datum available to determine potential loss is the market value of agricultural products in St. Lucie County, which in 2012 totaled \$165 million. Bases on past occurrences and the cyclical nature of drought conditions indicates that the probability of future drought incidents in the County is high.

4.2.3 Geologic Hazards

4.2.3.1 Hazard Identification

Earthquakes

An earthquake is a sudden, rapid shaking of the earth caused by the breaking and shifting of rock beneath the earth's surface. This shaking can cause buildings and bridges to collapse; disrupt gas, electric, and phone service; and sometimes trigger landslides, flash floods, fires, and tsunamis.

Although Florida is not usually considered to be a state subject to earthquakes, several minor shocks have occurred over time, but only one caused any damage (US DOI, USGS, 2015). One of the most frightening and destructive phenomena of nature is a severe earthquake and its terrible aftereffects. An earthquake is the sudden, rapid shaking of the earth, caused by the breaking and shifting of subterranean rock as it releases strain that has accumulated over a long time.

Florida is situated on the trailing (or passive) margin of the North American Plate while California is located on its active margin. The active margin is bounded by faults that generate earthquakes when there is movement along them. This is the fundamental reason that Florida has an extremely low incidence of earthquakes while California experiences many (mostly small) earthquakes.

For hundreds of millions of years, the forces of plate tectonics have shaped the earth, as the huge plates that form the earth's surface slowly move over, under and past each other. Sometimes, the movement is gradual. At other times, the plates are locked together, unable to release accumulated energy. When the accumulated energy grows strong enough, the plates break free. If the earthquake occurs in a populated area, it may cause many deaths and injuries, as well as extensive property damage.

All 50 states and five U.S. territories are at some risk for earthquakes. Earthquakes can happen at any time of the year (FEMA , Ready, 2015).

Sinkholes – Sinkholes are a common feature of Florida's landscape.

Sinkholes are common where the rock below the land surface is limestone, carbonate rock, salt beds, or rocks that can naturally be dissolved by ground water circulating through them. As the rock dissolves, spaces and caverns develop underground. Sinkholes are dramatic because the land usually stays intact for a while until the underground spaces get too big. If there is not enough support for the land above the spaces, then a sudden collapse of the land surface can occur. These collapses can be small or they can be large, and they can occur under a house or road.

A significant number of sinkholes tend to occur in the years that follow a drought. When an area has a long-term lack of rain and water levels decrease, there is usually a correlated link to an increase in incidences of sinkholes being reported. Historically, years where dry weather has been followed by wet weather have resulted in some of the greatest increases in sinkhole occurrences.

They are only one of many kinds of karst landforms, which include caves, disappearing streams, springs, and underground drainage systems, all of which occur in Florida. Karst is a generic term that refers to the characteristic terrain produced by erosional processes associated with the chemical weathering and dissolution of limestone or dolomite, the two most common carbonate rocks in Florida. Dissolution of carbonate rocks begins when they are exposed to acidic water.

Most rainwater is slightly acidic and usually becomes more acidic as it moves through decaying plant debris. Limestones in Florida are porous, allowing the acidic water to percolate through them, dissolving some limestone and carrying it away in solution. Over time, this persistent erosion process has created extensive underground voids and drainage systems in much of the carbonate rocks throughout the state. Collapse of overlying sediments into the underground cavities produces sinkholes (Florida Department of Environmental Protection, 2012).

When groundwater discharges from an underground drainage system, it is a spring, such as Wakulla Springs, Silver Springs, or Rainbow Springs. Sinkholes can occur in the beds of streams, sometimes taking all of the stream's flow, creating a disappearing stream. Dry caves are parts of karst drainage systems that are above the water table, such as Marianna Caverns.

Other subterranean events can cause holes, depressions or subsidence of the land surface that may mimic sinkhole activity. These include subsurface expansive clay or organic layers which compress as water is removed, collapsed or broken sewer and drain pipes or broken septic tanks, improperly compacted soil after excavation work, and even buried trash, logs and other debris. Often a depression is not verified by a licensed professional geologist or engineer to be a true sinkhole and the cause of subsidence is not known. Such events are called subsidence incidents (Florida Department of Environmental Protection, 2012).

Historic Events

In January 1879, a shock occurred near St. Augustine that is reported to have knocked plaster from walls and articles from shelves. Similar effects were reported in Daytona Beach. The shock was felt in Tampa, throughout central Florida, and in Savannah, Georgia as well (USDOI, USGS, 2015).

In January 1880, another earthquake occurred, this time with Cuba as the focal point. Shock waves were sent as far north as the town of Key West (US DOI, USGS, 2015).

Jacksonville residents felt many of the strong aftershocks that occurred in September, October, and November 1886 (USDOI, USGS, 2015).

In June 1893, Jacksonville experienced a minor shock that lasted about 10 seconds. Another earthquake occurred in October 1893, which also did not cause any damage (USDOI, USGS, 2015).

In November 1948, doors and windows rattled in Captiva Island, west of Ft. Myers. It was reportedly accompanied by sounds like distant heavy explosions (USDOI, USGS, 2015).

The most damage from sinkholes tends to occur in Florida, Texas, Alabama, Missouri, Kentucky, Tennessee, and Pennsylvania; however, Florida has more sinkholes than any other state in the nation. Florida's average sinkhole size is 3 to 4 feet across and 4 to 5 feet deep. For this reason, and because they are one of the predominant land form features of the State, sinkholes are of particular interest to Florida. Their development may be sudden and has the potential to result in property damage or loss of life.

There are as many as 150 sinkholes reported each year in Florida. This is due to the fact that the Florida landmass is generally formed by limestone with a thin layer of sediment covering it, usually consisting of very loose sediment. However, the covering on the porous limestone below is often only temporary.

Limestone is very soluble, and as water moves through it, small holes develop and grow into larger holes. The overburdened sediments can cover the hole for a certain amount of time, but once the holes gets larger than their ability to bridge across it, the sediments collapse into it.

Sinkholes are common wherever there is limestone terrain, but are rare in the southern part of the State. Central Florida and the Big Bend region have the largest incidence of sinkholes (State of Florida Enhanced Hazard Mitigation Plan 2013).

Table on next page illustrates the Modified Mercalli Intensity Scale of 1931 is the basis for the U.S. evaluation of seismic intensity. Unlike earthquake magnitude, which indicates the energy a quake expends, Mercalli intensity denotes how strongly an earthquake affects a specific place. The scale has 12 divisions, identified in the table below, and given that the best available data do not indicate that there have ever been any earthquakes in St. Lucie County or the municipalities, we could reasonable expect to experience Level I on the intensity scale.

Table 4.29 The Modified Mercalli Intensity Scale

I. Not felt except by a very few under especially favorable circumstances.
II. Felt only by a few persons at rest, especially on upper floors of buildings. Delicately suspended objects may swing.
III. Felt quite noticeably indoors, especially on upper floors of buildings, but many people do not recognize it as an earthquake. Standing motor cars may rock slightly. Vibration like passing truck. Duration estimated.
IV. During the day felt indoors by many, outdoors by few. At night some awakened. Dishes, windows, and doors disturbed; walls make creaking sound. Sensation like heavy truck striking building. Standing motorcars rock noticeably.
V. Felt by nearly everyone; many awakened. Some dishes, windows, etc., broken; a few instances of cracked plaster; unstable objects overturned. Disturbance of trees, poles, and other tall objects sometimes noticed. Pendulum clocks may stop.
VI. Felt by all; many frightened and run outdoors. Some heavy furniture moved; a few instances of fallen plaster or damaged chimneys. Damage slight.
VII. Everybody runs outdoors. Damage negligible in buildings of good design and construction slight to moderate in well built ordinary structures; considerable in poorly built or badly designed structures. Some chimneys broken. Noticed by persons driving motor cars.
VIII. Damage slight in specially designed structures; considerable in ordinary substantial buildings, with partial collapse; great in poorly built structures. Panel walls thrown out of frame structures. Fall of chimneys, factory stacks, columns, monuments, walls. Heavy furniture overturned. Sand and mud ejected in small amounts. Changes in well water. Persons driving motor cars disturbed.
IX. Damage considerable in specially designed structures; well-designed frame structures thrown out of plumb; great in substantial buildings, with partial collapse. Buildings shifted off foundations. Ground cracked conspicuously. Underground pipes broken.
X. Some well-built wooden structures destroyed; most masonry and frame structures destroyed with foundations; ground badly cracked. Rails bent. Landslides considerable from river banks and steep slopes. Shifted sand and mud. Water splashed over banks.
XI. Few, if any (masonry), structures are left standing. Bridges destroyed. Broad fissures in ground. Underground pipelines completely out of service. Earth slumps and land slips in soft ground. Rails bent greatly.
XII. Damage total. Waves seen on ground surfaces. Lines of sight and level distorted. Objects thrown upward into the air.

4.2.3.2 Risk Assessment

The USDO, USGS and the Florida Department of Natural Resources Bureau of Geology have created a map illustrating sinkhole type, development, and distribution for the state of Florida. Sinkhole risk is categorized using four categories. According to this map, St. Lucie County lies in Area II, which is classified as having coverage between 20 and 200 feet thick, consisting of incohesive and permeable sand. Sinkholes are few, shallow, of small diameter, and develop gradually. Cover-subsidence sinkholes dominate in this area.

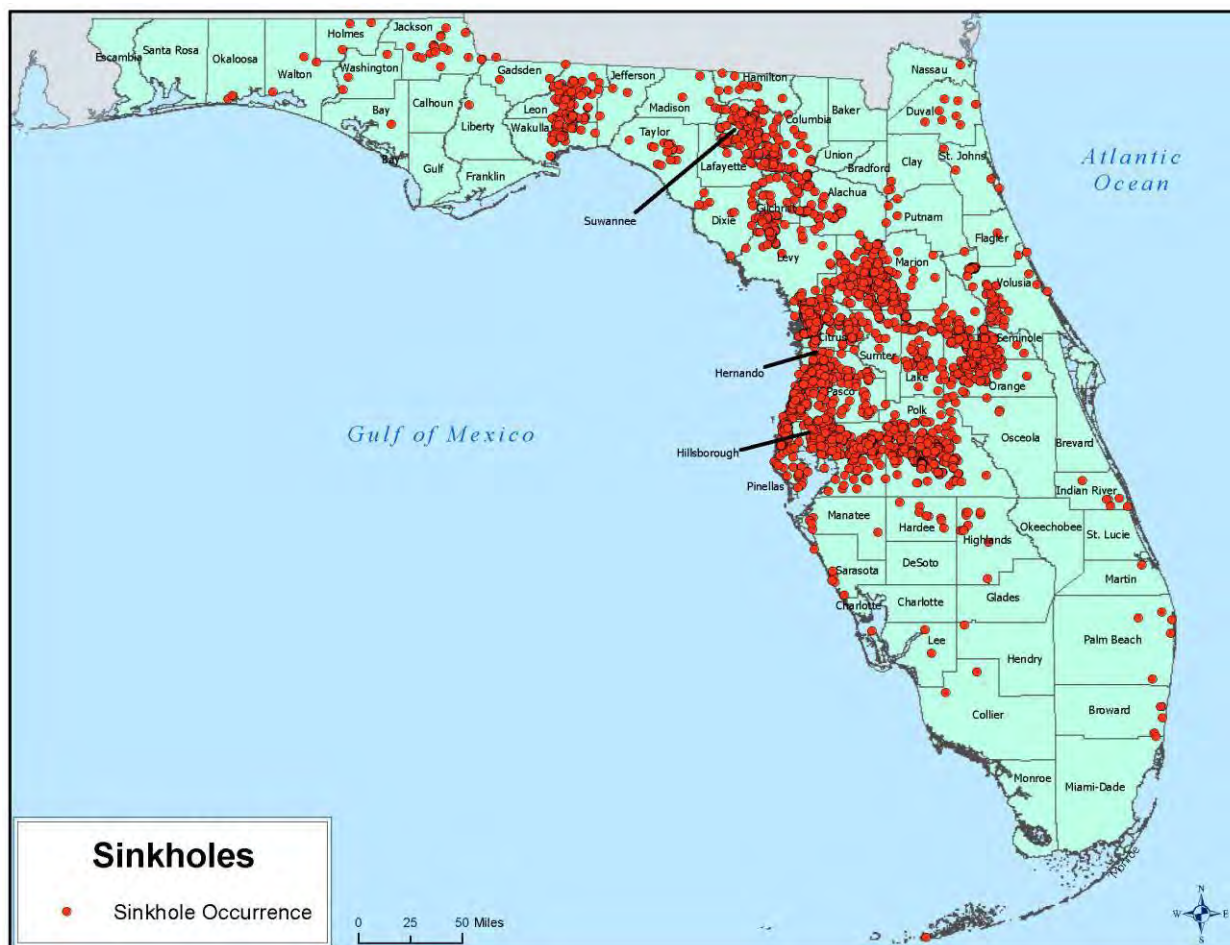
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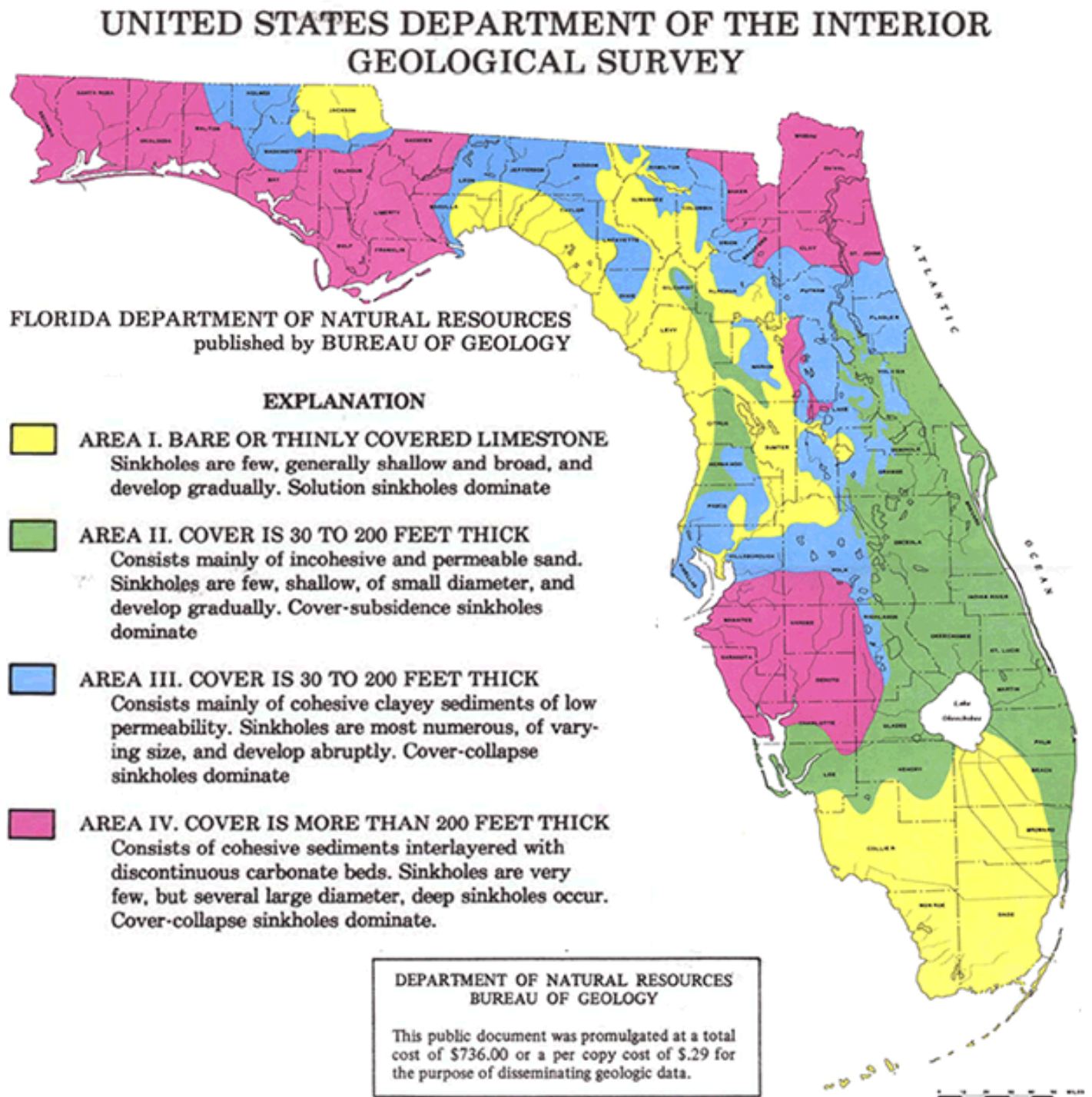
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Figure 4.11 Sinkhole Occurrences in Florida



Source: FL DEM State of Florida Enhanced Hazard Mitigation Plan

Figure 4.12 Sink Hole Areas in Florida



Source USGS

Geologic events can have the following potential impacts within a community:

- Electric power outage;
- Surface and air transportation disruption;
- Potable water system loss or disruption;
- Sewer system outage;
- Telecommunications system outage;
- Human health and safety;
- Psychological hardship;
- Economic disruption;
- Disruption of community services;
- Damage to identified historical resources;
- Fire;
- Flooding;
- Toxic releases; and
- Stormwater drainage impairment.

There have never been any soil failures or seismic or sinkhole activity in St. Lucie County. While these hazards exist, the probability of future occurrence at this time must be considered extremely low. Due to the lack of occurrence and extremely low probability this hazard, impact due to an occurrence in St. Lucie County cannot be accurately identified.

4.2.4 Tsunami

4.2.4.1 Hazard

A tsunami is a series of waves created when a body of water, such as in an ocean, is rapidly displaced. A tsunami has a much smaller amplitude (wave height) offshore, and a very long wavelength (often hundreds of kilometers long), which is why they generally pass unnoticed at sea, forming only a passing "hump" in the ocean. Tsunamis have been historically referred to as tidal waves because as they approach land, they take on the characteristics of a violent onrushing tide rather than the sort of cresting waves that are formed by wind action upon the ocean. Since they are not actually related to tides, the term is considered misleading and its usage is discouraged by oceanographers.

There is another phenomenon often confused with tsunamis called rogue waves. Debate as to whether these waves are related to tsunamis. They are included in this section as the mitigation plans address the threat in the same relative manner. The characteristics are:

- Unpredictable nature
- Little is known about the formation
- May be caused by regularly-spaced ocean swells that are magnified by currents or the atmosphere

Tsunami waves are unlike typical ocean waves generated by wind and storms. When tsunamis approach shore, they behave like a very fast moving tide that extends far inland. Tsunamis are not like the typical wind-generated waves popular with surfers. Even "small" tsunamis are associated with extremely strong currents, capable of knocking someone off their feet. Because of complex interactions with the coast, tsunami waves can persist for many hours.

As with many natural phenomena, tsunamis can range in size from micro-tsunamis detectable only by sensitive instruments on the ocean floor to mega- tsunamis that can affect the coastlines of entire oceans, as with the Indian Ocean tsunami of 2004 (United States Geological Survey)

Historic Events. The history of big waves hitting Florida is short:

- A powerful earthquake in Portugal in 1755 killed thousands there and launched a tsunami that hit much of the U.S. coast. Scientists do not know if that caused many deaths in Florida, which was sparsely populated at the time;
- An earthquake in Charleston, S.C., in 1886 triggered a wave that surged up the St. Johns River to Jacksonville, causing few if any deaths;
- An 18-foot rogue wave flooded the parked cars of sunbathers on Daytona Beach without warning in 1992. This event, called a meteorological tsunami (or meteotsunami), was a tsunami- like wave phenomenon of meteorological origin. Tsunamis and meteotsunamis propagate in the water in the same way and have the same coastal dynamics. For an observer on the coast where it strikes, the two types would look the same and have the same impacts. Research is currently underway to better understand these events, with the goal of developing a protocol for issuing meteotsunami warnings along the U.S. coast.

Computer modeling for a large tsunami originating from the Puerto Rico trench could inundate the St. Lucie County beaches on the barrier islands, including in the City of Fort Pierce to the dune line with 6-8 foot waves. Modeling results from a tsunami triggered by a large Portugal earthquake suggest more significant tsunami impacts locally. In this case, ocean water may breach the dune line in some locations and reach as far as Highway A1A. Therefore, St. Lucie County Emergency Management, in conjunction with the Melbourne Office of the National Weather Service, has developed a St. Lucie County-specific

Tsunami Warning and Evacuation Plan. The goal of this plan is to properly prepare and respond to the residents of St. Lucie County in the unlikely event of a tsunami impacting our area. Mitigation efforts for a tsunami include preparation, planning and exercising, providing for immediate evacuations of the beaches through multiple means (mass notification system, sirens, Ocean Rescue personnel, Sheriff's Office personnel, Fire District and public education).

Modeling indicates that the threat is 300 feet inland from the shoreline, which is up to the dune line in most of the areas. There are residences along the beaches that would be threatened as well. The St. Lucie Nuclear Power Plant's elevation is above a worst case scenario tsunami.

St. Lucie County Tsunami Hazard Zone

National Weather Service guidelines indicate that the (Florida Atlantic Coast) Tsunami Hazard Zone extends 300 feet inland beyond the high tide location. In order to verbally describe the Tsunami Hazard Zone more comprehensively, while also allowing for a greater safety zone for the protection of life and property, St. Lucie County Emergency Management has defined the Tsunami Hazard Zone as the region from east of Highway A1A to the Atlantic. Within this hazard zone there are five facilities considered Critical Infrastructure. On South Hutchinson Island Fire Station 2 is on Seaway Drive, Fire Station 8 and a St. Lucie County Water Treatment facility are both located in the 8000 block of South Highway A1A. On North Hutchinson Island Fire Station 9 and a St. Lucie County Utilities water treatment plant are located in the 4600 Block North Highway A1A. The St. Lucie Nuclear Power Plant's elevation is above a worst case scenario tsunami.

St. Lucie County Tsunami Safe Zone

St. Lucie County Emergency Management has defined the Tsunami Safe Zone as the area west of North Old Dixie Highway north of Seaway Drive and west of 2nd St. in Fort Pierce south of Seaway Drive to Florida Avenue.

4.2.4.2 Vulnerability Assessment

Tsunami events occur most often in the Pacific Ocean, but they are a global phenomenon and all are potentially dangerous, though they may not damage every coastline they strike. Analyzing the past 150 years of tsunami records shows that the most frequent and destructive tsunamis to affect the U.S. have occurred along the coasts of California, Oregon, Washington, Alaska, and Hawaii.

However, the State of Florida is located within the Caribbean area, and over the past 156 years, the Caribbean has experienced more total tsunami events, which have ultimately resulted in over 2,500 deaths. Modeling results from a tsunami triggered by a large Portugal earthquake suggest more significant tsunami impacts locally. Overall, Florida has experienced few destructive tsunami or rogue wave events, but there were several small events.

Modeling has indicated that a wave generated in a tsunami threatening St. Lucie County would be 6-8 feet in height. Impact to the County would be comparable to impact as a result of significant storm surge due to a hurricane.

4.2.4.3 Probability

Florida has directly experienced few destructive tsunami and rogue wave events since 1900, with only five small recorded occurrences. As there has never been a recorded impact from tsunamis and rogue waves, the probability of future events in St. Lucie County is very low.

4.2.5 Sea Level Rise

Southeast Florida is vulnerable to sea level rise (SLR) due to its peninsular geomorphology and low topography. Mapping different sea level rise inundation scenarios helps to identify areas at potential risk and aids in planning for a sustainable community. Inundation maps, identifying land at elevations below sea level, highlight areas located near St. Lucie County's coastline and tidal waterways. Inland areas identified as vulnerable are low-lying areas, which may be of future concern for storm water management but are not directly hydrologically connected to tidal waters.

The sea level has risen in Florida about 9 inches over the past century according to the South Florida Water Management District. The US National Research Council reported in 2008 that the global consensus is that the Earth's climate is warming and the impact of that climate change is accelerated sea level rise. There is no general consensus on the rate at which sea level will rise however and therefore with scientific literature offering various acceleration rate theories we are only able to be certain that sea level will continue to rise.

The barrier islands of St. Lucie County are Hutchinson Island north of the St. Lucie Inlet and Jupiter Island south of the inlet. State Road A1A extends south on Hutchinson Island into St. Lucie County from St. Lucie County. Developed areas are predominately residential. The Indian River Lagoon lies between the western shore of the barrier islands in St. Lucie County the mainland This estuary is designated as an Estuary of National Significance. The Lagoon contains highly productive natural communities and ecosystem, including sea grass beds, algal beds, and oyster beds, mud flats, tidal marshes and mangrove swamps. The Lagoon is heavily used by recreational boaters and is important to the marine business communities as prime locations for boat facilities and waterfront development. Impacts include storm-water drainage systems, saltwater intrusion into public water supplies and sources, and ecological impacts of inundation and saltwater intrusion into estuaries and freshwater systems.

Sea level changes can have a compounded impact when a flooding or storm surge event impacts coastal and inland areas. Adaptation of current structures, mitigation and/or managed withdrawal of structures in redevelopment activities can lessen economic and social impacts to County businesses, government and residents (St. Lucie County CEMP, 2014).

In June 2012 a regional vulnerability study was completed for the Treasure Coast (Martin, St. Lucie, Indian River and Palm Beach counties) by the Treasure Coast Regional Planning Council. The study included sea level rise.

4.2.5.1 Methodology

The Sea Level Rise Vulnerability Analysis includes a parcel-level analysis identifying structures within the Sea Level Rise Inundation Zone created under the Sea Level Rise 2 feet scenario, a parcel-level analysis identifying structures within the increased area of Category 3 and 5 storm surge, and an analysis of roads that are within the 2 foot Inundation Zone and increased storm surge scenarios. The analysis was conducted for Indian River, Martin, and St. Lucie Counties.

A similar analysis was just completed for Palm Beach County under a separate contract. Some general caveats and assumptions for the Sea Level Rise 2 Feet Scenario and Increased Storm Surge under the Sea Level Rise Scenario analysis include:

- These data are for planning, education, and awareness purposes only and are not appropriate for site-specific analysis, navigation or permitting.
- The mapping does not incorporate future changes in coastal geomorphology and assumes present conditions will persist, which will not be the case.
- The analysis does not use a hydrologic analysis; therefore, hydrologically unconnected areas of inundation are still displayed. Unconnected areas may not be impacted.
- Storm surge under sea level rise scenario inundation polygons are shown for all areas at or below mean higher high water that are hydrologically connected to the ocean via a connected water body or adjacent upland.
- Variations between modeled versus actual storm surge will occur due to variations in coastal bathymetry, hurricane forward speed, radius of the storm, and astronomical tides at the time of land fall.

The 2 foot Inundation Zone was developed consistent with the methodology used by the Southeast Florida Regional Climate Change Compact and the mapping process used by the NOAA Coastal Services Center. The analysis used a digital elevation model (DEM) derived from the latest available Light Detection and Ranging (LiDAR) data in addition to NOAA's VDatum Tool to create a tidal surface. The 2 foot rise in sea level was mapped on top of Mean Higher High Water (MHHW). Inundation Zones for Category 3 and Category 5 Storm Surge under the Sea Level Rise (2ft) Scenario were generated using the Statewide Regional Evacuation Study Surge Model Tool Version 2.9i6, created by Marshall Flynn with the Tampa Bay Regional Planning Council and used previously to produce the County level Storm Atlases of the Statewide Regional Evacuation Study Program.

The created scenario Inundation Zones were used with county Property Appraiser parcel data and Florida Department of Transportation major roads data to identify parcels with structures and roads that could potentially be impacted by the sea level rise scenario.

Table 4.30 Analysis of Vulnerability to Sea Level Rise of 2 feet

St. Lucie County						
Countywide Estimated Vulnerability to Sea Level Rise and Storm Surge as Increased by Sea Level Rise						
Structure Use	Sea Level Rise (2ft) Scenario		Increased Category 3 Storm Surge under Sea Level Rise (2ft)		Increased Category 5 Storm Surge under Sea Level Rise (2ft) Scenario	
	# of Units	Value (\$) in	# of Units	Value (\$) in	# of Units	Value (\$) in thousands
Single Family Residential	1,847	270,561.5	2,018	216,138.2	3,661	287,605.4
Multi-Family Residential	7,347	1,458,039.1	248	165,276.5	770	312,540.1
Mobile Home Residential	2,258	56,894.5	208	4,504.4	146	1,448.5
Institutional/Governmental	140	290,046.6	29	41,190.5	67	166,000.0
Commercial	105	562,849.3	55	16,657.9	93	28,009.2
Industrial	14	5,464.2	36	12,432.7	28	32,447.1
Agricultural	15	1,514.2	5	2,872.3	18	1,455.6
Miscellaneous/Undefined	6	302.2	1	10.7	3	40.5
Total	11,732	2,645,671.6	2,600	459,083.2	4,786	829,546.4

Table 4.31 Analysis of Vulnerability to Roadways from Sea Level Rise of 2 feet

Indian River, Martin, and St. Lucie Counties		
Estimated Vulnerability of Treasure Coast Roads to Storm Surge as Increased by Sea Level Rise		
Road Functional Classification	Increased Category 3 Storm Surge under Sea Level Rise (2ft) Scenario	Increased Category 5 Storm Surge under Sea Level Rise (2ft)
	Length Inundated (m)	Length Inundated (m)
Rural: Minor Arterial	5,320.52	5,385.94
Urban Collector	53,719.94	121,467.01
Urban: Local	23,041.83	27,253.44
Urban: Minor Arterial	94,017.61	150,691.82
Urban: Principal Arterial - Other	18,175.86	70,000.46
Urban: Principal Arterial - Other Freeways and Expressways	-	1,063.37
Total	194,275.75	375,862.04

Table 4.32– Analysis of Vulnerability to Critical Facilities from Sea Level Rise of 2 Feet

St. Lucie County Critical Facilities								
Estimated Vulnerability to Flooding and								
Category of	Total # of	# of Facilities located in SFHA	# of Facilities Located in Surge Zone					
			Category 1	Category 2	Category 3	Category 4	Category 5	Surge Total
Public Safety	36	6	0	4	1	0	0	5
Healthcare	16	0	0	0	0	0	3	3
Education	91	4	0	0	0	2	1	3
Government	28	2	0	0	0	1	5	6
Infrastructure	41	10	0	3	5	3	0	11
Community Resources	36	6	0	2	5	2	0	9
Recovery Operations	12	0	0	0	0	0	0	0
Shelters	13	0	0	0	0	0	0	0
Group Homes	1	0	0	0	0	0	0	0
Transportation	4	0	0	0	0	0	0	0
Communication	3	1	0	0	0	0	0	0
Banks	0	0	0	0	0	0	0	0
Businesses	0	0	0	0	0	0	0	0
Oil and Gas	4	0	0	0	0	0	0	0
Total	285	29	0	9	11	8	9	37

At this time Sea Level Rise is not an additional impact to hurricanes or rough surf that may impact St. Lucie County, therefore the probability is considered low. It is understood that Sea Level Rise is very likely to being more probabilistic in the future, therefore it is a consideration identified within the Countywide Post Disaster Redevelopment Plan. St. Lucie LMS will continue to monitor the changes in Sea level Rise to further assess vulnerability, probability and impact.

4.2.6 Dam/Levee Failure

4.2.6.1 Hazard Identification

The 10 Mile Creek Water Preserve Area is

Ten Mile Creek is an above-ground reservoir of approximately 526 acres surrounded by a 12 to 15-foot tall embankment. The reservoir was originally designed to store up to 6,000 acre feet of water at an average depth of 10 feet. The project also includes the following components: a natural preserve area, a pump station for filling the reservoir from Ten Mile Creek, a gated water level control structure for the moderated release of water back to the creek, and a 132-acre STA with associated pumps and structures for water treatment and release. The intent of the WPA is to filter and clean agricultural run off water before it enters the North Fork of the St Lucie River.

The project was initiated in 2005 by the US Army Corps of Engineers (USACE) with the intent of turning it over to the South Florida Water Management District (SFWMD). Due to construction and legal issues the project is not complete and has not been turned over to the SFWMD.

4.2.6.2 Risk Assessment:

In 2006 the USACE completed a risk/vulnerability assessment based on the original design. Due to re-engineering and construction this assessment cannot be considered valid. A comprehensive assessment will be done once the legal issues are resolved and the project is completed.

4.3 TECHNOLOGICAL HAZARDS

4.3.1 Agricultural Pests and Diseases

4.3.1.1 Hazard Identification

Florida is among the top three agriculture-producing states in the nation.

Agriculture generates farm cash receipts of nearly \$6 billion annually, of which, citrus and vegetable crops contribute more than 40%. The industry is susceptible to many hazards including freezes, droughts, and exotic pests or diseases. Agricultural crops are grown throughout the state, and every region is vulnerable to the effects of an exotic pests or disease infestation. As a result, Florida uses the second highest volume of pesticides in the nation.

Agriculture and citrus production play key role in the St. Lucie County economy; 56.8% of the County is agricultural farmland. The main threats to the St. Lucie County agriculture industry are (1) Citrus canker and greening, (2) Mediterranean fruit fly (Medfly), (3) Tomato Yellow Leaf Curl Virus (TYLCV), and (4) Africanized honey bees.

4.3.1.2 Citrus Canker and Citrus Greening

Unlike most citrus diseases, which are predominantly fungi (plant-like), citrus canker is a serious bacterial disease. It is microscopic (unseen by the human eye), and can be spread by wind, rain, humans (contact), landscaping (trimming, chipping, cutting, or pruning citrus trees), and fruit removal (peeling, buying, selling, transporting, picking, etc.). Remember that the disease is bacterial in nature and the only remedies existing for its control are decontamination (chemical antibacterial), or sanitation (fire).

The best choice for control is decontamination by antibacterial instead of the latter. The latter choice (firing) involves the eradication of 900 feet of citrus trees within the radius of an infected tree. In a neighborhood or subdivision, this would mean a substantial removal, of neighboring citrus trees for blocks, or in the case of citrus growers the removal of more than 200 acres per infected tree site in contiguous groves.

Since 1995 citrus canker has been detected in 24 Florida counties: Brevard, Broward, Charlotte, Clay, Collier, De Soto, Glades, Hardee, Hendry, Highlands, Hillsborough, Indian River, Lee, Manatee, Martin, Miami-Dade, Monroe, Okeechobee, Orange, Osceola, Palm Beach, Polk, Saint Lucie, and Sarasota. Prior to the 2004 hurricane season, canker was confined primarily to South Florida. Florida is currently under a statewide quarantine by the USDA and no citrus may leave the state unless the USDA has issued a limited permit. No Florida grown citrus may enter any citrus producing states or territories. No citrus plants or parts may enter or exit Florida (Florida Department of Agriculture and Consumer Services, 2012).

Huanglongbing (HLB; citrus greening) is thought to be caused by the bacterium, *Candidatus Liberibacter asiaticus*. HLB has seriously affected citrus production in a number of countries in Asia, Africa, the Indian subcontinent and the Arabian Peninsula, and was discovered in July 2004 in Brazil. Wherever the disease has appeared, citrus production has been compromised with the loss of millions of trees. HLB has not been reported in Australia or in the Mediterranean Basin. In August 2005, the disease was found in the south Florida region of Homestead and Florida City. Since that time, HLB has been found in commercial and residential sites in all counties with commercial citrus (UF-IFAS Citrus Extension, 2013).

4.3.1.3 Mediterranean fruit fly (Medfly)

Another threat to St. Lucie County's agriculture industry is the Medfly. It is one of the world's most destructive pests and infests more than 260 different plants that are important for U.S. food producers, homeowners, and wildlife. It is considered the greatest pest threat to Florida's \$1.5 billion citrus crop, as well as endangering many other economically significant crops (Florida Department of Agriculture and Consumer Services, 2002). For example, a Medfly outbreak in 1997 cost an estimated \$32 million to eradicate in Manatee, Marion, Orange, Polk, and Sarasota counties (United States Department of Agriculture, 1999). If a long-term or widespread Medfly infestation were to occur, Florida growers would not be permitted to ship numerous fruit and vegetable crops to many foreign and domestic markets. The movement of fruits and vegetables, even within the state, would be disrupted, which could lead to higher prices in the supermarket. Costly post-harvest treatment of fruits and vegetables to meet quarantine restrictions of domestic and foreign markets also would be required. If the med fly is not eradicated in Florida, ongoing pesticide treatments by homeowners and commercial growers will be necessary.

Adult Medflies are up to 1/4" long, black with yellow abdomens, and have yellow marks on their thoraxes. Their wings are banded with yellow. The Medfly damages produce by laying eggs in the host fruit or vegetable. The resulting larvae feed on the pulp, rendering the produce unfit for human consumption. In addition to citrus, med flies will feed on hundreds of other commercial and backyard fruit and vegetable crops.

Because medflies are not strong fliers, the pest is spread by the transport of larval-infested fruit. The major threats come from travelers, the U.S. mail, and commercial fruit smugglers. Several steps have been taken to prevent new infestations. State and Federal officials are working with postal authorities to develop ways to inspect packages suspected of carrying infested fruit. In addition, public education efforts carrying the message, "Don't Spread Med" are being expanded (Florida Department of Agriculture and Consumer Services, 1998).

4.3.1.4 Tomato Yellow Leaf Curl Virus (TYLCV)

The Tomato Yellow Leaf Curl Virus is believed to have entered the state in Dade County sometime in early 1997 (UF, IFAS, 2007). Symptoms vary among tomato types, but in general, leaves produced shortly after infection are reduced in size, distorted, cupped inward or downward, and have a yellow mottle. Less than one in ten flowers will produce fruit after TYLCV infection, severely reducing yields.

The virus is transmitted by adult silverleaf whiteflies. Although frequent applications of pesticides help to decrease whitefly populations and suppress the spread of TYLCV, virus management through whitefly control is not possible in years where whitefly populations are high. Fortunately, the virus is not transmitted through seed or casual contact with infected plants.

4.3.1.5 Africanized Honey Bees

The Florida Department of Agriculture and Consumer Services reports that Africanized bees have been a threat in the nation's southwest and southern states since the 1990's with 17 human deaths reported to present. Florida incurred the first human death from an attack of Africanized bees in April 2008; however, livestock and pets have been the majority of reported deaths.

The Africanized honeybee (AHB) population has grown and will continue to grow in Florida due to its numerous pathways into the state and the lack of effective eradication products or techniques.

AHBs were brought to Brazil in the 1950s for testing as possible alternative pollinators and honey producers because of their reputation of being hardy in tropical environments. At the time, their defensive nature and ability to reproduce in greater numbers were not well understood. Some were accidentally released and have spread throughout South and Central America, Mexico and the southern U.S.

The department monitors 500 bait hives placed throughout the state, primarily in port areas, along Interstate 10 and on the Florida-Alabama border. The bait hives are checked on a three-week cycle based on the reproduction habits of the AHB. St. Lucie County Fire Rescue and Animal Control are equipped to make rescues in the event of an AHB attack. Removal of AHB is done by private contractor.

4.3.1.6 Vulnerability Assessment

Agricultural pests and diseases can have the following potential impacts within a community:

- Human health and safety;
- Psychological hardship;
- Economic disruption;
- Agricultural/fisheries damage; and
- Damage to critical environmental resources.

Agricultural pests and diseases are a more significant hazard in those areas of the County where agriculture is a more significant element in the economic base. In 2013-2014, St. Lucie County produced 7,840,000 boxes of citrus (USDA). The State of Florida has the second highest tomato sales, bringing in \$348 million in 2012-2013 (Florida Tomatoes, 2014).

4.3.1.7 Risk Assessment

At the time of publication, no model was available to determine the potential loss associated due to agricultural pests and disease. Since St. Lucie County has a large agricultural market, damage to the local economy could be significant. Given the small number of past events, the probability of future occurrence for agricultural pests and disease is low. Therefore, this hazard is not fully profiled.

4.3.2 Epidemics

4.3.2.1 Hazard Identification

Infectious diseases emerging throughout history have included some of the most feared plagues of the past. New infections continue to emerge today, while many of the old plagues are still with us. As demonstrated by influenza epidemics, under suitable circumstances, a new infection first appearing anywhere in the world could travel across entire continents within days or weeks. Due to the potential of complex health and medical conditions that can threaten the general population, Florida's vulnerability to an epidemic is continually being monitored. With millions of tourists arriving and departing the state annually, disease and disease exposure (airborne, vector, and ingestion) are constantly evaluated and analyzed.

Historical. During the 2013-2014 season, influenza A (H3N2), 2009 influenza A (H1N1), and influenza B viruses circulated in the United States. 2009 H1N1 viruses predominated overall during the 2013-14 flu season, though influenza B viruses became the predominant virus nationally later in the season and caused an increase in influenza-like-illness in parts of the northeast especially. After several recent influenza A (H3N2)-predominant seasons, 2013-14 was the first H1N1-predominant season since the 2009 H1N1 pandemic. (CDC, 2015)

The 2014 Ebola epidemic is the largest in history, affecting [four](#) countries in West Africa. Two imported cases, including one death, and two locally acquired cases in healthcare workers have been [reported in the United States](#). CDC and partners are taking precautions to prevent additional cases of Ebola in the United States. (CDC, 2015) Florida Department of Health in St. Lucie County, St. Lucie County Fire Rescue, Martin Health Systems, and the St. Lucie County Sheriff's Office developed a response plan, trained and equipped responders to be able to respond to such an incident should an incident occur in St. Lucie County.

Primarily, as a result of the entrance of undocumented aliens into south Florida, and the large number of small wildlife, previously controlled or eradicated diseases have surfaced. Health officials closely monitor this potential threat to the public health. The emphasis upon preventive medical measures such as school inoculation, pet licensing, rodent/insect eradication, water purification, sanitary waste disposal, health inspections, and public health education mitigates this potential disaster.

Another potential threat to south Florida's population is food contamination.

Frequent news stories document that *E. coli* and botulism breakouts throughout the country are not that uncommon. Most recently, millions of pounds of possibly contaminated beef from the Hudson packing plant were seized by the Department of Agriculture and destroyed.

4.3.2.2 Vulnerability Assessment

Epidemics can have the following potential impacts within a community:

- Human Health & Safety;
- Psychological Hardship;
- Economic Disruption;
- Disruption of Community Services; and
- Agricultural/Fisheries Damages.

High-density, low-income communities or neighborhoods that have antiquated well and septic systems in older neighborhoods tend to be at higher risk for illnesses associated with epidemics. The County has replaced antiquated septic and well systems in the Golden Gate, Booker Park, and Banner Lake neighborhoods. Advances in community health programs have reduced the potential for future occurrence of epidemics. The St. Lucie County CEMP Appendix VI addresses planning, training, and exercise for pandemics. At this time, the potential for future occurrence is low.

4.3.2.3 Risk Assessment

At the time of publication, no model was available to determine the potential loss associated with epidemic in St. Lucie County.

4.3.3 Radiological Accidents

4.3.3.1 Hazard Identification

While an actual release of radioactive material is extremely unlikely and the immediate threat to life extremely low, vulnerability to a nuclear plant disaster could consist of long-range health effects with temporary and permanent displacement of population from affected areas. The potential danger from an accident at a nuclear power plant is exposure to radiation. This exposure could come from the release of radioactive material from the plant into the environment, usually characterized by a plume (cloudlike) formation. The area the radioactive release may affect is determined by the amount released from the plant, wind direction and speed, and weather conditions (e.g., rain) that would quickly drive the radioactive material into the ground, hence causing increased deposition of radionuclides.

Twenty eight of the 67 counties in the State of Florida are involved in preparedness planning for a commercial nuclear power plant emergency. Emergency Planning Zones (EPZs) have been designated for each power plant to enhance planning efforts for an emergency. An EPZ is comprised of two zones, the 10- mile plume exposure zone and the 50-mile ingestion exposure zone. Specific coordinating procedures for response to a General Emergency at a nuclear power plant have been prepared in the form of Standard Operating Procedures. These include Emergency Classification Levels, which assist in notifying the public if a problem occurs at a plant. They are defined by four categories (Nuclear Regulatory Commission, 2016):

- Notification of Unusual Event - Events are in progress or have occurred which indicate a potential degradation of the level of safety of the plant or indicate a security threat to facility protection has been initiated. No releases of radioactive material requiring offsite response or monitoring are expected unless further degradation of safety systems occurs.
- Alert - Events are in progress or have occurred which involve an actual or potential substantial degradation of the level of safety of the plant or a security event that involves probable life threatening risk to site personnel or damage to site equipment because of HOSTILE ACTION. Any releases are expected to be limited to small fractions of the Environmental Protection Agency (EPA) [protective action guides \(PAGs\)](#)
- Site Area Emergency - Events are in progress or have occurred which involve actual or likely major failures of plant functions needed for protection of the public or hostile action that results in intentional damage or malicious acts; 1) toward site personnel or equipment that could lead to the likely failure of or; 2) that prevent effective access to, equipment needed for the protection of the public. Any releases are not expected to result in exposure levels which exceed EPA PAG exposure levels beyond the site boundary.
- General Emergency - Events are in progress or have occurred which involve actual or imminent substantial core degradation or melting with potential for loss of containment integrity or hostile action that results in an actual loss of physical control of the facility. Releases can be reasonably expected to exceed EPA PAG exposure levels offsite for more than the immediate site area.

4.3.3.2 Vulnerability Assessment

The St. Lucie Nuclear Power Plant (SLNPP) is located 5.5 miles north of Stuart on Hutchinson Island in St. Lucie County. The facility contains two reactors and is owned and operated by the Florida Power & Light Corporation. This places the northeast quadrant of St. Lucie County, the City of Fort Pierce and Port St. Lucie (Zone 7) within the 10-mile Emergency Planning Zone (EPZ) and the entire County 50-mile Ingestion Pathway Zone. St. Lucie County Emergency Management Agency has a radiological planner on staff.

Emergency response plans written and maintained by the County exceed FEMA's criteria to protect the health and safety of the residents of the County. FEMA reviews the plans annually.

Radiological accidents can have the following potential impacts on a community:

- Electrical power outage;
- Surface and air transportation disruption;
- Telecommunications system outage;
- Human and health safety;
- Psychological hardship;
- Economic disruption;
- Disruption of community services;
- Damage to critical environmental resources; and
- Toxic releases.

A practice nuclear power plant emergency drill is held each year. Biennially FEMA evaluates the exercise. The plans are reviewed by FEMA, incorporated with the exercise evaluation and are incorporated into Florida's Annual Letter of Certification to FEMA to provide "Reasonable Assurance to the NRC that St. Lucie County's plan and procedures are more than adequate to respond to an emergency at the nuclear power plant.

4.3.3.3 Risk Assessment

The nuclear incidents of Chernobyl, Ukraine in 1986 and Fukushima Japan in 2011 were due to inadequate design and emergency redundancies. Nuclear power plants in the United States are required to have more redundant systems in place to ensure they will not experience the same failures as Chernobyl and Fukushima. There has not been any emergencies requiring response for an incident at the SLNPP to date. Since Fukushima the NRC has re-evaluated geological conditions and tsunami probability in this region and have re-confirmed the original evaluation that the SLNPP is not at risk from either. The SLNPP is built 28' above sea level and will not suffer damage from storm surge that would jeopardize the integrity of the plant.

4.3.4 Power Failures

4.3.4.1 Hazard Identification

Power failure can result from a variety of related causes, including sagging lines due to hot weather, flashovers from transmission lines to nearby trees, and incorrect relay settings. According to the electric utility industry's trade association, the potential for such disturbances is expected to increase with the profound changes now sweeping the electric utility industry.

To address times when generating capacity is tight, or falls below consumer demand due to State or local emergencies, the Florida Electrical Emergency Contingency Plan was developed. Alerts have been created to give early warning of potential electricity shortfalls and bring utilities, emergency management officials, and the general public to a state of preparedness.

The plan: (1) provides for early identification of situations that could lead to electricity shortages; (2) coordinates actions among utilities, regulators, and state and local emergency agencies, (3) establishes a communication network to assist consumers during an electricity shortage; and (4) issues appeals for voluntary conservation. The Contingency Plan has four stages (Florida Reliability Coordinating Council, 2004):

Generating Capacity Advisory

A Generating Capacity Advisory is primarily for information purposes. It starts utility tracking activities, and it initiates inter-utility and inter-agency communication. No action by the public is required. General information may be distributed to consumers to forewarn them of conditions if necessary.

Generating Capacity Alert

A Generating Capacity Alert starts actions to increase reserves. Available emergency supply options will be explored. When reserves fall below the size of the largest generating unit in the state, loss of that size unit to an unexpected mechanical failure could lead to blackouts somewhere since insufficient backup is available.

Generating Capacity Emergency

A Generating Capacity Emergency occurs when blackouts are inevitable somewhere in Florida. Every available means of balancing supply and demand will be exhausted. Rolling blackouts, manually activated by utilities, are a last resort to avoid system overload and possible equipment damage. Frequent status reports are provided to agencies and the media. The Division of Emergency Management will consider using the Emergency Broadcast System to inform citizens of events and to direct them to available shelters if conditions warranted. Recognizing the consequences of a loss of electricity, individual utility emergency plans include provisions for special facilities critical to the safety and welfare of citizens.

System Load Restoration

System Load Restoration is instituted when rolling blackouts have been terminated and power supply is adequate. It is the recovery stage, and efforts are made to provide frequent system status reports.

4.3.4.2 Historic Events

In the U.S., from July 2nd to August 10th, 1996, the Western States Utility Power Grid reported widespread power outages that affected millions of customers in several western states and adjacent areas of Canada and Mexico.

A massive power outage struck the northeast on Thursday, 14 August 2003.

Areas affected by the outage included New York City and Albany, New York; Cleveland and Toledo, Ohio; Detroit and Lansing, Michigan; parts of New Jersey and Connecticut; as well as Toronto and Ontario, Canada. The most extensive power failure in history, it shut down 10 major airports, 9 power plants, affected 50 million people, and led to a declared State of Emergency in New York City. The Ford Motor Company lost production capability at 21 of its facilities. Two deaths and 71 fires were attributed to the outage in New York City alone (Gellman and Milbank, 2003). The preliminary economic impacts of this event are large. It is estimated that the power failure cost approximately \$1 billion including \$800 million in unsold goods and services and \$250 million in spoiled food.

4.3.4.3 Vulnerability Assessment

Power failures have the same potential impacts in all St. Lucie County communities.

The vulnerabilities of all communities to power failures are considered moderate. The power grid throughout St. Lucie County is diversified, and there are no single choke points or distribution nodes whose failure would disrupt power distribution to the entire community. The probability of future occurrence of small-scale power outages in St. Lucie County is high, due to the frequency of thunderstorms and lightning as well as transportation system accidents. The probability of future occurrence of large-scale power outages in St. Lucie County is low.

Power failure can have the following potential impacts on a community:

- Electric power outage;
- Surface and air transportation distribution;
- Potable water system loss or disruption;
- Sewer system outage;

- Telecommunications system outage;
- Human and health safety;
- Psychological hardship;
- Economic disruption; and
- Disruption of community services

4.3.4.4 Risk Assessment

At the time of publication, no model was available to determine the potential loss associated with power failure in St. Lucie County.

4.3.5 Hazardous Materials Accidents

4.3.5.1 Hazard Identification

Hazardous materials accidents can occur anywhere there is a road, rail line, pipeline, or fixed facility storing hazardous materials. Virtually the entire state is at risk to an unpredictable accident of some type. Most accidents are small spills and leaks, but some result in injuries, property damage, environmental contamination, and other consequences. These materials can be poisonous, corrosive, flammable, radioactive, or pose other hazards and are regulated by the Department of Transportation. However, out of approximately 1,631 hazardous materials incidents reported statewide in 2014 (SERC, 2015).

Emergencies involving hazardous materials can be expected to range from a minor accident with no off-site effects to a major accident that may result in an off-site release of hazardous or toxic materials. The overall objective of chemical emergency response planning and preparedness is to minimize exposure for a wide range of accidents that could produce off-site levels of contamination in excess of Levels of Concern established by the EPA. Minimizing this exposure will reduce the consequences of an emergency to people in the area near to facilities that manufacture, store, or process hazardous materials (TCRPC, 1998).

A large volume of hazardous materials is transported to and through the County by railroad and highway, air, water, and pipeline daily. Within St. Lucie County, there are a number of both public and private fixed facilities that produce or use hazardous materials. Coordinating procedures for hazardous material response are found within the County's Emergency Plan for Hazardous Materials. U.S. Highway 1 is the main urban north-south route connecting the adjacent counties and serving the coastal area. The Florida Turnpike, a north-south toll route, and Interstate 95 bisect the County, running parallel to each other. Two railroads pass through St. Lucie County, running north and south. The eastern railroad is serviced by Florida East Coast Railway, and the western railroad by the CSX Corporation. In addition to the County's Emergency Plan for Hazardous Materials, Local Emergency Planning Committee officials have prepared a plan for use in responding to and recovering from a release of hazardous or toxic materials. This plan addresses the range of potential emergency situations and the appropriate measures to be implemented to minimize exposure through inhalation, ingestion, or direct exposure (TCRPC, 1998). Within the County there are numerous public and private facilities that store hazardous materials and Extremely Hazardous Substances (EHS's). The frequency of fixed facility hazardous materials releases is 3-5 per year with the majority of these having been small-scale incidents. The severity of impact of such an event depends on the proximity to population, chemical character, wind direction, response capability and situational awareness.

Under SARA Title III reporting there are fifty- two sites storing EHS's in the County. The number of facilities varies from year to year as new facilities come on line and others permanently remove chemicals.

The Florida Gas Transmission Company (GSTC) owns and operates a line that transports natural gas through St. Lucie County. GSTC has a pressure booster facility on Orange Avenue Extension. Several other companies have buried distribution and feeder pipes throughout the County.

Mishandling and improper disposal or storage of medical wastes and low-level radioactive products from medical use are also a hazard to St. Lucie County. For example, a few years ago an incident occurred in New Jersey when improper disposal of medical wastes resulted in some of the used products ending up on Atlantic Ocean beaches.

4.3.5.2 Vulnerability Assessment

Hazardous materials events can have the following potential impacts within a community:

- Surface and air transportation disruption;
- Human health and safety;
- Psychological hardship;
- Economic disruption;
- Disruption of community services;
- Fire; and Toxic releases.

A community's vulnerability to hazardous materials accidents depends on three factors:

- The major transportation routes that pass through the community;
- The hazardous material generators located in or near the community; and
- The resources in terms of people and property are in an area of possible impact from a hazardous materials release.

Minor gas leaks, usually feeder lines cut during construction, occur somewhat frequently with minimal impact and rapid resolution and restoration. A major gas leak occurred in Port St. Lucie approximately 1 AM Sunday May 10, 2015 as a result of a car accident breaching an above ground pipe. The leak took 5 hours to repair. A one mile radius evacuation was effected by police and fire personnel. Over all 8,700 customers were impacted, including two hospitals, multiple medical providers and six schools. The outage went from I95 at St. Lucie West Blvd, along Port St. Lucie Blvd, along US1 into Martin County. Service restoration took approximately ten days. No economic impact has been identified for this incident

Overall, St. Lucie County has a moderate vulnerability to impacts from hazardous materials releases. There are relatively few major generators within the County, and those that do exist are generally away from major population centers. Areas of high vulnerability for these hazardous materials accidents are the Cities of Fort Pierce and Port St. Lucie, St. Lucie Village and along South Indian River Drive due to the transportation networks (both highway and rail) that passes through those areas.

The probability of future occurrence of hazardous materials accidents in St. Lucie County is medium, due to the number of major transportation routes in the County. The frequency of fixed facility hazardous materials releases is 3-5 per year with the majority of these having been small-scale incidents.

Because of its location relative to the St. Lucie nuclear power plant, all of St. Lucie County has a high vulnerability to a nuclear power plant accident or nuclear materials release. While the County's level of vulnerability is high, the frequency with which nuclear power plant accidents occur is very low, and the overall risk to the citizens of St. Lucie County is therefore considered low. Nuclear emergency in St. Lucie County has received massive emergency management attention at all levels of government. Emergency management planning and regulation relative to nuclear power plant accidents exist at all levels: Federal, State, local, and corporate.

4.3.5.3 Risk Assessment

At the time of publication, no model was available to determine the potential loss associated with hazardous materials accidents in St. Lucie County.

4.3.6 Transportation System Accidents

4.3.6.1 Hazard Identification

Florida has a large transportation network consisting of major highways, airports, marine ports, and passenger railroads. The heavily populated areas of St. Lucie County are particularly vulnerable to serious accidents, which are capable of producing mass casualties. With the linear configuration of several major highways in St. Lucie County, such as interstate highways and the Florida Turnpike, major transportation accidents could occur in a relatively rural area, severely stressing the capabilities of local resources to respond effectively. A recent notorious example is the crash in the Everglades of ValuJet Flight 597 on 11 May 1996, which resulted in 109 fatalities and cost millions of dollars, severely taxing the financial and public safety resources of Dade County. Similarly, a major transportation accident could involve a large number of tourists and visitors from other countries, given Florida's popularity as a vacation destination, further complicating the emergency response to such an event.

As a major industrial nation, the U.S. produces, distributes, and consumes large quantities of oil. Petroleum-based oil is used as a major power source to fuel factories and various modes of transportation, and in many everyday products, such as plastics, nylon, paints, tires, cosmetics, and detergents (EPA, 1998). At every point in the production, distribution, and consumption process, oil is stored in tanks. With billions of gallons of oil being stored throughout the country, the potential for an oil spill is significant, and the effects of spilled oil can pose serious threats to the environment.

In addition to petroleum-based oil, the U.S. consumes millions of gallons of non-petroleum oils, such as silicone and mineral-based oils and animal and vegetable oils. Like petroleum products, these non-petroleum oils are often stored in tanks that have the potential to spill, causing environmental damages that are just as serious as those caused by petroleum-based oils.

To address the potential environmental threat posed by petroleum and non-petroleum oils, the EPA has established a program designed to prevent oil spills. The program has reduced the number of spills to less than 1 % of the total volume handled each year (EPA, 1998).

St. Lucie County has about 22 miles of Atlantic Ocean coastline that is subject to contamination caused by an oil spill. By Executive Order, the responsibility for preparing response plans for coastal oil spills is designated to the FDEP. The Florida Coastal Pollutant Spill Plan has been prepared to coordinate response procedures and recovery efforts after a spill. There are two active oil field regions in Florida: in Escambia and Santa Rosa counties in the Panhandle, and Collier, Dade, Hendry, and Lee counties in southwest Florida. Oil spills may occur from various activities including pipeline ruptures; well blowouts; leaking oil storage containers; and activities associated with offshore oil exploration, production, and transportation. In 2010, an oil-drilling platform in the Gulf of Mexico had exploded. The Deepwater Horizon explosion resulted in an estimated 4.9 million barrels of oil being discharged into the Gulf of Mexico. Coastal communities had cleaned up 4.6 million pounds of oily material in 2013. St. Lucie County was not impacted by the oil spill. (Encyclopedia Britannica, 2014)

The probability of coastal oil spills in St. Lucie County is currently in the medium to low range, with “Low” frequency and a potential for “High” severity of impacts to beaches, wildlife, community populations and tourism. St. Lucie County has an extremely limited history of minor oil spills. Florida prohibits oil drilling in its waters within 125 miles of its shoreline, yet St. Lucie County is vulnerable to coastal oil spills resulting from in-shore activities as well as from the after effects of hurricanes on offshore tanker transport ships. Regardless of cause, a large coastal oil spill could directly affect the value of the properties involved and, in the case of a long-term incident, could damage the overall coastal recreational and commercial activities of the area. St. Lucie County Emergency Management and the Engineering Department, including coastal engineering, actively participates with the U.S. Coast Guard in the planning and maintenance of the Area Contingency Plan (ACP) for St. Lucie County in planning for an oil spill impacting the County. The ACP was significantly updated after Deep Water Horizon

4.3.6.2 Vulnerability Assessment

Transportation system accidents can have the following potential impacts within a community:

- Surface and air transportation disruption;
- Navigable waterway impairment;
- Human health and safety;
- Economic disruption;
- Disruption of community services;
- Environment;
- Wildlife and Habitat;
- Fire; and
- Toxic releases.

4.3.6.3 Risk Assessment

The Treasure Coast International Airport and Business Park Master Plan was updated in 2011. The airport is currently 3,600 and growing. There are no commercial carriers utilizing the airport at this time. In 2013 there were 176,111 departures with a projected increase to 194,871 departures in 2018.

The airport is home to more than 200 privately owned aircraft. There are nine (9) flight schools, a number of commercial aircraft construction and maintenance operations. The airport is located directly to the north of the City of Fort Pierce, and the runway approaches pass directly over St. Lucie Village.

Aviation is an important element of the economy in St. Lucie County, and this activity raises the County's vulnerability to aviation associated accidents.

Vulnerability to transportation system accidents is also associated with the highway and rail systems that run through the County. Individual community and population center vulnerabilities to this hazard are entirely dependent upon location. The City of Fort Pierce is the County's major transportation hub, with rail yards, trucking centers, and a port. Transportation accidents have created blockages of highways within the City. Due to their locations along the rail line, both St. Lucie Village and unincorporated South Indian River Drive have higher vulnerabilities to rail system accidents. St. Lucie Village also is more vulnerable to plane crashes due to its location relative to the St. Lucie airport. The western, unincorporated portion of the County and City of Port St. Lucie has higher vulnerability to major highway accidents due to the presence of I-95 and the Florida Turnpike.

The Port of Fort Pierce is located within the Indian River Lagoon, a designated National Estuary under the EPA's National Estuary Program (Section 320 - 33 USC 1330) of the Clean Water Act. As such, this Port is by definition located within an environmentally sensitive area. Spills of any type in such areas are of more significance due to the sensitive nature of the environmental resources seen there.

4.3.6.4 Risk Assessment

At the time of publication, data were not available to determine the potential loss in St. Lucie County due to transportation system accidents.

4.3.7 Wellfield Contaminations

4.3.7.1 Hazard Identification

The development of wellfield protection programs is a major preventative approach for the protection of community drinking water supplies. Wellfield protection is a means of safeguarding public water supply wells by preventing contaminants from entering the area that contributes water to the well or wellfield over a period of time. Management plans are developed for the wellfield protection area that include inventorying potential sources of ground water contamination, monitoring for the presence of specific contaminants, and managing existing and proposed land and water uses that pose a threat to ground water quality.

Ground water is an essential natural resource. It is a source of drinking water for more than half of the U.S. population and more than 95% of the rural population. In addition, ground water is a support system for sensitive ecosystems, such as wetlands or wildlife habitats.

Between 1971 and 1985, there were 245 ground water-related outbreaks of disease, resulting in more than 52,000 individuals being affected by associated illnesses. While most of these diseases were short-term digestive disorders caused by bacteria and viruses, hazardous chemicals found in wells nationwide also pose risks to public health.

The 1986 Amendments to the Federal Safe Drinking Water Act require states to implement wellfield protection programs for public water wells. Prevention strategies include maintaining isolation distances from potential contamination sources, reporting to the state violations of isolation distance, and asking a local governmental unit to regulate these sources.

St. Lucie County's Conservation Element of the Comprehensive Plan contains a policy regarding wellfield protection. The policy (8.1.5.1) outlines the following standards for wellfield protection within the County:

1. Assure adequate and safe water supplies to present and future citizens of the County;
2. Comply with Federal and State regulations in the best interests of the County and its future growth and development;
3. Avoid crisis water supply situations through careful groundwater resources planning and conservation;
4. Identify and protect the functions of public wellfield areas, including recharge of those areas, and provide incentives to keep the present and future public well fields compatible with the needs expressed in 1) above;
5. Ensure that new development is compatible with existing local and regional water supply capabilities; and
6. Protect present and future public well fields against depletion and contamination through appropriate regulation, incentives, and cooperative agreements.

Section 6.03.00 of the St. Lucie County Land Development Code also outlines requirements for protecting wellfields within the County. Wellfield contamination has not been a major problem for most of St. Lucie County. There is some potential exposure to this hazard in the eastern portion of the County, but overall the County vulnerability to this hazard is considered low.

Cleaning up contaminated ground water can be technically difficult, extremely expensive, and sometimes simply cannot be done. Contaminated ground water also affects the community by discouraging new businesses or residents from locating in that community

4.3.7.2 Vulnerability Assessment

Wellfield contamination can have the following potential impacts within a community:

- Potable water system loss or disruption;
- Sewer system outage;
- Human health and safety;
- Psychological hardship;
- Economic disruption; and
- Disruption of community services.

Wellfield contamination has not been a major problem for most of St. Lucie County. There is some potential exposure to this hazard in the eastern portion of the County, but overall the County vulnerability to this hazard is considered low.

4.3.7.3 Risk Assessment

At the time of publication, no data were available to determine the potential loss associated with wellfield contamination in St. Lucie County.

4.3.8 Communications Failures

4.3.8.1 Hazard Identification

As society emerges from industrial production into the age of information, we are seeing new kinds of technological accidents/disasters. Recently, a communications failure occurred that was the worst in 37 years of satellite service. Some major problems with the telecommunications satellite Galaxy IV drastically affected 120 companies in the paging industry. Radio and other forms of news broadcasts also were affected. The pager failure not only affected personal and business communications, but emergency managers and medical personnel as well.

4.3.8.2 Vulnerability Assessment

Communications failure can have the following potential impacts within a community:

- Telecommunications system outage;
- Economic disruption; and
- Disruption of community services.

Communications failures have a greater potential to produce adverse economic impacts in business-based rather than retirement or residential communities. On the other hand, communications system failures in residential and retirement communities may put more human lives at risk. St. Lucie County's vulnerability to communications systems failures is generally considered moderate. The Cities of Fort Pierce and Port St. Lucie has a higher vulnerability to this hazard because they are centers of government and business within the County. St. Lucie County's vulnerability to this hazard is no greater or less than most other Florida coastal counties. The probability of future occurrence of communications failure in St. Lucie County is low. St. Lucie County and all jurisdictions within the County maintain a robust system of redundancy in the communications structure. St. Lucie County has two redundant data centers, one at the Information Technology Data Center and one at the Emergency Operations Center. These data centers provide redundancy for much of the County's IT infrastructure.

4.3.8.3 Risk Assessment

At the time of publication, no data were available to determine the potential loss in St. Lucie County due to communications failure.

4.4 SOCIETAL HAZARDS

This subsection will now identify those hazards in St. Lucie County identified as being societal hazards.

4.4.1 Terrorism and Sabotage

4.4.1.1 Terrorism

Terrorist attacks both foreign and domestic may pose a threat to our community at any time. These attacks may take the form of chemical releases, accidents, mass shootings, or improvised explosives. In 2001, several letters containing anthrax were delivered to various locations in the United States. One of them was sent to a tabloid media center in Boca Raton, Florida. The attack resulted in one person dying from the exposure and a second employee being hospitalized. Five other employees from the building were exposed without effect.

The building was closed and required Federal Assistance to decontaminate the facility. The public hysteria from the event impacted emergency services all across the United States (CDC, 2005). There was grave concern that the biological agent could have been released to the public at other venues as well. The public governmental/political, transportation, commercial, infrastructure, cultural, academic, research, military, athletic, and other activities and facilities constitute ideal targets for terrorist attacks, which may cause catastrophic levels of property and environmental damage, injury, and loss of life.

Acts of terrorism also are capable of creating disasters, which threaten the safety of a large number of citizens.

4.4.1.2 Historical Events

On September 11, 2001, terrorists attacked the World Trade Center in New York City and the Pentagon in Washington, DC, crashing hijacked commercial airplanes into the structures. All told, approximately 3,000 civilians and emergency response personnel perished in the attack. The long-term economic and psychological impacts of this event are astounding. New York City alone experienced capital losses totaling 34 million dollars. The attack on the World Trade Center resulted in a loss of 12.5 million square feet of office space and damaged 7.7 million more. The insured losses associated with the event totaled 52 million dollars to date. The City estimates that 125,300 jobs were lost because of the attack (National Conference of State Legislatures, 2003).

4.4.1.3 Computer Accidents and Sabotage

The President's Commission on Critical Infrastructure Protection (PCCIP) recently reported that there is increasing threat that the U.S. could suffer something similar to an "Electronic Pearl Harbor". Networked information systems present new security challenges in addition to the benefits they offer. Long-term power outages could cause massive computer outages, with severe economic impacts such as loss of sales, credit checking, banking transactions, and ability to communicate and exchange information and data. "Today, the right command sent over a network to a power generating station's control computer could be just as effective as a backpack full of explosives, and the perpetrator would be harder to identify and apprehend," states the PCCIP report.

With the growth of a computer-literate population, increasing numbers of people possess the skills necessary to attempt such an attack. The resources to conduct a cyber-attack are now easily accessible everywhere. A personal computer and an Internet service provider anywhere in the world are enough to cause a great deal of harm. Threats include:

- Human error;
- Insider use of authorized access for unauthorized disruptive purposes;
- Recreational hackers - with or without hostile intent;
- Criminal activity - for financial gain, to steal information or services, or organized crime;
- Industrial espionage;
- Terrorism - including various disruptive operations; and
- National intelligence - information warfare, intended disruption of military operations.

The effects of such activities may take the form of disruption of air traffic controls, train switches, banking transfers, police investigations, commercial transactions, defense plans, power line controls, and other essential functions. As the Internet becomes more and more important, the loss of its services, becomes a greater hardship for those relying on this new form of communication.

Computer failures could affect emergency communications as well as routine civilian applications, such as telephone service, brokerage transactions, credit card payments, Social Security payments, pharmacy transactions, airline schedules, etc.

4.4.1.4 Vulnerability Assessment

Terrorism and sabotage events can have the following potential impacts within a community:

- Electric power outage;
- Surface and air transportation disruption;
- Potable water system loss or disruption;
- Sewer system outage;
- Telecommunications system outage;
- Human health and safety;
- Psychological hardship;
- Economic disruption;
- Disruption of community services;
- Damage to critical environmental resources;
- Damage to identified historical resources;
- Fire; and Toxic releases.

The possibilities for terrorism and sabotage in St. Lucie County are extremely limited, and the County's vulnerability to this hazard is very low. The City of Fort Pierce has a slightly higher vulnerability to terrorism as the center of government including the Federal Courthouse, but this vulnerability is still considered low. Port St. Lucie have a slightly higher risk of what may be described as "Celebrity Terrorism" due to the national prominence of some of their citizens, New York Mets Spring Training, but the overall community vulnerability still remains low. St. Lucie County would be vulnerable to terrorist acts targeting (a) the nuclear power facility; (b) food production facilities; (c) water and wastewater treatment facilities; (d) public/crowded events; and (e) residents with considerable wealth. Although terrorism has come to the forefront recently, in St. Lucie County, the probability of future occurrence is low.

4.4.1.5 Risk Assessment

At the time of publication, no data were available to determine the potential loss in St. Lucie County due to terrorism.

4.4.2 Civil Disturbances

4.4.2.1 Hazard Identification

As in any other area, St. Lucie County is subject to civil disturbances in the form of riots, mob violence, and a breakdown of law and order in a focalized area. Communities with racial mixtures, gang violence, and drug trafficking are increasingly aware of the need to plan for civil disturbance emergencies. Although they can occur at any time, civil disturbances are often preceded by periods of increased tension caused by questionable social and/or political events such as controversial jury trials or law enforcement actions. Police services are responsible for the restoration of law and order in any area of the County.

4.4.2.2 Vulnerability Assessment

Civil disturbance can have the following potential impacts within a community:

- Surface and air transportation disruption;
- Human health and safety;
- Psychological hardship;
- Economic disruption;
- Disruption of community services;
- Damage to identified historical resources; and
- Fire.

The probability of future occurrence of civil disturbances in St. Lucie County is considered very low. The City of Fort Pierce has a moderate vulnerability in this area, and the Indiantown area has a low vulnerability. In general, civil disturbance is not a significant hazard faced by St. Lucie County.

4.4.2.3 Risk Assessment

At the time of publication, no data were available to determine the potential loss in St. Lucie County due to civil disturbance.

4.4.3 Immigration Crises

4.4.3.1 Hazard Identification

Florida's location as the nearest U.S. landmass bordering the Caribbean basin makes it a chosen point of entry for many migrants attempting to enter the country illegally. A major consequence of a mass arrival of illegal immigrants could be a disruption of the routine functioning of the impacted community, resulting in significant expenditures related to the situation. An example of this threat occurred in 1994, when the state responded to two mass migration incidents. In May 1994, there was an unexpected migration of approximately 100 Haitian refugees; while in August 1994, there was an influx of 700 Cubans. These events are typically preceded by periods of increasing tension abroad, which can be detected and monitored. Enforcement of immigration laws is a Federal government responsibility. However, it is anticipated that joint jurisdictional support of any operation will be required from the State and local governments.

The Atlantic shore of St. Lucie County is the sporadic scene of the arrival of undocumented aliens. The County has both the history and the potential for the unannounced arrival of a large number of aliens.

Until relieved of the responsibility by the State and Federal governments, St. Lucie County must be capable of providing mass refugee care to include shelter, food, water, transportation, medical, police protection, and other social services. St. Lucie County is growing in population. However, a sudden mass exodus or migration to the area could strain or overwhelm local resources and infrastructure. There is a "Low" probability for experiencing such an event in St. Lucie County. During a mass migration, community populations can increase significantly when large numbers of families are displaced from other communities fleeing disaster impacts. Temporary mass migration into the County may require shelter services in a host capacity. Additional reliance on community members, hotels, churches and state and federal programs may be necessary to house dislocated families.

4.4.3.2 Vulnerability Assessment

Immigration crises can have the following potential impacts within a community:

- Human health and safety;
- Psychological hardship;
- Economic disruption; and
- Disruption of community services.

Reviewing the data on past illegal immigration and mass population movements such as the Haitian influx and Cuban raft incidents of the 1980's indicates that illegal immigration has never reached a crisis state for the local authorities in St. Lucie County. Overall, the County vulnerability to this hazard is very low. Due to demographic features, the City of Fort Pierce has a slightly higher, but still low vulnerability to illegal immigration impacts.

4.4.3.3 Risk Assessment

At the time of publication, no data were available to determine the potential loss in St. Lucie County due to civil disturbances.

4.5 SUMMARY

St. Lucie County's proximity to water and large population concentrations contribute to the heightened potential for property and content damage, loss of life, community and emergency service disruption, and economic losses due to flooding and storm surge. Another key vulnerability factor making St. Lucie County at risk to wildland fire is the current pattern of "patchwork" development. This development pattern leaves undeveloped parcels scattered throughout developments creating the opportunity for fire to move throughout a neighborhood.

St. Lucie County is a large and diversified County and while all County residents are exposed to some degree to the hazards identified in **Table 4.33**, geographic location as well as other factors greatly affects individual vulnerabilities to specific hazards. While there are only three incorporated jurisdictions in St. Lucie County, there are several geographically distinct urbanized population centers, and their relative vulnerabilities also have been indicated in **Table 4.34**.

Table 4.34 summarizes St. Lucie County's risk or potential for loss relative to each of the hazards identified.

Table 4.33 St. Lucie County Hazard Vulnerability by Incorporated Jurisdiction and Population Centers

Hazard Category	Incorporated Jurisdictions			Unincorporated Population Centers						
	St. Lucie Village	City of Fort Pierce	City of Port St. Lucie	Unincorporated Barrier Island	South Indian River Drive	North Beach Area	White City Area	Lakewood Park Area	West County Area	Overall County Vulnerability
Floods	3	3	3	3	2	3	3	3	3	3
Hurricanes / Tropical storms	3	3	3	3	3	3	3	3	3	3
Tornadoes	1	2	1	1	1	2	3	2	1	1
Severe Thunderstorms & Lightning	2	2	2	2	2	2	2	2	1	2
Wildland Fires	2	2	2	1	2	1	2	3	3	3
Extreme Temperatures	2	2	2	1	1	1	1	2	3	2
Erosion	1	3	2	2	2	2	1	1	1	2
Drought	1	1	1	1	1	1	1	2	2	2
Sea Level Rise	L	L	L	L	L	L	L	L	L	L
Dam/Levee Failure	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
Seismic Hazards (Earthquakes, Sinkholes)	1	1	1	1	1	1	1	1	1	1
Agricultural Pests & Disease	1	1	1	1	1	1	1	1	H	M
Epidemics	1	2	2	1	2	1	2	2	1	2
Technological Hazards	2	2	2	1	1	1	1	1	1	2
Societal Hazards	1	2	1	1	1	1	1	1	1	1

- 3- most of the population affected, major damage to old, poorly maintained, and mobile home structures, some damage to newer structures built to code.
2- around 50% of the population affected, mobile homes and poorly built or maintained structures damaged
1- special portions of the population affected; day to day operations not affected, minor cosmetic damage

Table 4.34 Risk Assessment and Hazard Evaluation for St. Lucie Count

Hazard Category	Hazard Evaluation			
	Probability	Vulnerability	Exposure	Risk (Potential for Loss)
Tornadoes	The probability of tornadoes in St. Lucie County is moderate: A FO to F3 tornado event is anticipated every 1.6 years with most classified as F0.	<p>Total property damage by tornadoes from 1950 to 2015 has been estimated at \$387,530 or approximately \$5,962 per year.</p> <p>Since 1950, tornadoes in St. Lucie County have caused 2 deaths and 27 injuries.</p>	<p>Tornadoes are rated from 0 to 5 based the Enhanced Fujita Scale . F0 tornados cause light damage, and F5 tornadoes cause incredible or catastrophic damage.</p> <p>Of the 41 tornadoes recorded in St. Lucie County since 1950, 29 (71%) were classified as F0, 7 (17%) were classified as F1, 2 (6%) were classified as F2, 2 (6%) were classified as F3.</p>	<p>Probability: 2 Vulnerability: 2 Exposure: 1 Risk: 1</p>
Severe Thunderstorms and Lightning	The probability of severe thunderstorms and lightning in St. Lucie County is high: Approximately two severe thunderstorm events can be anticipated each year.	Since 1963, these storms have resulted in 6 injuries and 7 fatalities (from lightning), and a total of \$308,500 in reported property damage (thunderstorms and lightning).	Thunderstorms with strong wind, downbursts, hail, and lightning are very common on Florida's southeast coast. Property losses due to lightning are poorly documented making it difficult to estimate real losses.	<p>Probability: 3 Vulnerability: 2 Exposure: 2 Risk: 2</p>

3 = High

2 = Moderate

1 = Low

Hazard Category	Hazard Evaluation			
	Probability	Vulnerability	Exposure	Risk (Potential for Loss)
Floods	<p>The probability of floods in St. Lucie County is high: A significant flood event can be anticipated every 2 years</p> <p>Storm surge of greater than 21 feet potentially can be experienced on the barrier islands and communities bordering the Indian River Lagoon.</p>	Countywide vulnerability is high but area specific.	Property damage along the coast of St. Lucie County occurs most often in the late winter or early spring and is associated with winter storms and northeasters. Flooding in the inland portions of the County occurs most often in the fall and is often associated with tropical depressions and tropical storms.	Probability: 3 Vulnerability: 3 Exposure: 3 Risk: 3
Hurricanes/Tropical Storms				

3 = High
 2 = Moderate
 1 = Low

Hazard Category	Hazard Evaluation			
	Probability	Vulnerability	Exposure	Risk (Potential for Loss)
Tropical Storms	The probability of tropical storms in St. Lucie County is high: A tropical storm event can be anticipated every 5 years.	All jurisdictions in the County: High from rain-associated flooding damages; relatively low from wind damage.	The major causes of damage associated with tropical storms are heavy rain and flooding. Many communities within St. Lucie County have particularly high vulnerabilities to flooding associated with these storms.	Probability: 3 Vulnerability: 3 Exposure: 2 Risk: 3
Category 1 Hurricanes	The probability of Category 1 hurricanes in St. Lucie County is high: A category 1 hurricane is anticipated every 5 to 10 years.	All jurisdictions in the County: High from rain-associated flooding damages; relatively low from wind damage	The continental shelf off St. Lucie County is beginning to widen. Consequently, St. Lucie County's vulnerability to storm surges from the Atlantic is relatively higher when compared to counties to the	Probability: 3 Vulnerability: 3 Exposure: 3 Risk: 3

3 = High
2 = Moderate
1 = Low

Hazard Category	Hazard Evaluation			
	Probability	Vulnerability	Exposure	Risk (Potential for Loss)
Category 2 Hurricanes	The probability of Category 2 hurricanes in St. Lucie County is high: A category 1 hurricane is anticipated every 5 to 10 years.	All jurisdictions in th County: High from rain-associated flooding; significant from wind damage.	Winds in Category 2 storms range from 96 to 110 mph. Significant damage is possible in older wood frame residential construction.	Probability: 3 Vulnerability: 3 Exposure: 3 Risk: 3
Category 3 Hurricanes	The probability of Category 3 hurricanes in St. Lucie County is moderate: A category 3 hurricane is anticipated every 10 to 25 years.	All jurisdictions in th County: Very high from rain-associated flooding coupled with storm surge; major from wind damage.	Winds in Category 3 storms range from 111 to 130 mph. These winds can do major damage to most residential construction.	Probability: 2 Vulnerability: 3 Exposure: 3 Risk: 3

3 = High
2 = Moderate
1 = Low

Hazard Category	Hazard Evaluation			
	Probability	Vulnerability	Exposure	Risk (Potential for Loss)
Category 4 Hurricanes	The probability of Category 4 hurricanes in St. Lucie County is low: The County has no history of a Category 4 hurricane.	All jurisdictions in the County: Very high from rain-associated flooding coupled with storm surge; massive from wind damage.	Sustained winds in a Category 4 hurricane range from 131 to 155 mph. There are very few commercial structures in St. Lucie County engineered to withstand such winds.	Probability: 1 Vulnerability: 3 Exposure: 3 Risk: 1
Category 5 Hurricanes	The probability of Category 5 hurricanes in St. Lucie County is very low: The County has no history of a Category 5 hurricane.	All jurisdictions in the County: Very high from rain-associated flooding coupled with very high storm surge; catastrophic in terms of wind damage.	Sustained winds in a Category 5 hurricane range upward from 155 mph. Very few structures can withstand these winds. Massive flooding may occur in the western part of the County resulting from the storm surge in Lake Okeechobee.	Probability: 1 Vulnerability: 3 Exposure: 3 Risk: 1

3 = High
2 = Moderate
1 = Low

Hazard Category	Hazard Evaluation			
	Probability	Vulnerability	Exposure	Risk (Potential for Loss)
Tornadoes	The probability of tornadoes in St. Lucie County is moderate: A FO to F3 tornado event is anticipated every 2 years with most classified as F0.	All jurisdictions in the County: Since 1950, tornadoes in St. Lucie County have caused 2 deaths and 27 injuries.	Tornadoes are rated from 0 to 5 based on their path length and mean width (Enhanced Fujita Scale). F0 tornados cause light damage, and F5 tornadoes cause incredible or catastrophic damage. Of the 36 tornadoes recorded in St. Lucie County since 1950, 25 (69%) were classified as F0, 7 (19%) were classified as F1, 2 (6%) were classified as F2, and 2 (6%) were classified as F3.	Probability: 2 Vulnerability: 3 Exposure: 1 Risk: 1
Severe Thunderstorms and Lightning	The probability of severe thunderstorms and lightning in St. Lucie County is high: Approximately two severe thunderstorm events can be anticipated each year.	All jurisdictions in the County: Since 1963, these storms have resulted in 6 injuries, 7 deaths (from lightning), \$308,050 in reported property damage (thunderstorms and lightning).	Thunderstorms with strong wind, downbursts, hail, and lightning are very common on Florida's southeast coast. Property losses due to lightning are poorly documented. It is estimated that the actual property damage from thunderstorms and lightning is closer to \$32,500 per month based on statewide insurance claims.	Probability: 3 Vulnerability: 2 Exposure: 2 Risk: 3

3 = High
2 = Moderate
1 = Low

Hazard Category	Hazard Evaluation			
	Probability	Vulnerability	Exposure	Risk (Potential for Loss)
Wildland Fires	The probability of wildland fires in St. Lucie County is moderate: Only 1/10 of County acreage is forested, but wildfire is a frequent event in these forested areas.	<p>All jurisdictions in the County:</p> <p>Wildfire is a significant and frequent hazard in specific areas of St. Lucie County.</p> <p>Vulnerability varies extensively with location.</p>	<p>Exposure to wildland fire varies greatly across St. Lucie County. While exposure is relatively low along the County's urbanized coastline, it is quite high in some of the landlocked interior communities.</p> <p>Mitigation projects addressing this issue need to be evaluated on a case by case basis.</p> <p>A 1999 fire was the most severe wildland fire event in the last 25 years in St. Lucie County. This fire caused damage to 130 homes and costs of \$5.9 million. This event most likely represents the County's best projection of it highest future exposure level for a single wildland fire event.</p>	<p>Probability: 2</p> <p>Vulnerability: 2</p> <p>Exposure: 2</p> <p>Risk: 2</p>

3 = High
2 = Moderate
1 = Low

Hazard Category	Hazard Evaluation			
	Probability	Vulnerability	Exposure	Risk (Potential for Loss)
Extreme Temperatures	<p>The probability of extreme temperatures in St. Lucie County is moderate: Freezing temperatures affecting agricultural crops can be anticipated once every six years.</p> <p>While the Probability of “heat waves” is low, the Probability of heat indexes within the range of causing health problems is moderate to high during the summer months.</p>	<p>St. Lucie County as a whole has a high economic vulnerability to freezing temperatures. The most significant area of impact is the commercial agricultural segment of the community, but countywide cold-sensitive ornamental landscaping also leaves many entities, public and private, open for significant economic loss.</p>	<p>While the loss of life from either extreme low or high temperatures in St. Lucie County is not great compared to national statistics, St. Lucie County does have a significant economic exposure to low temperatures in both the public and private sectors. The total market value of production for St. Lucie County in 2012 was \$165,000,000.</p>	<p>Probability: 2 Vulnerability: 2 Exposure: 2 Risk: 2</p>

3 = High

2 = Moderate

1 = Low

Hazard Category	Hazard Evaluation			
	Probability	Vulnerability	Exposure	Risk (Potential for Loss)
Erosion	The probability of erosion in St. Lucie County is high: Coastal erosion is continual and is exacerbated by tropical storms, winter storms, and hurricanes. It is anticipated there will be at least one storm event on an annual basis that will contribute to erosion.	<p>All the coastal communities have high vulnerability relative to beach erosion.</p> <p>Potential long-term mitigation will focus on overall sand budgets and sand transport rates. Mitigation projects in this area should be evaluated carefully by experienced coastal engineers.</p> <p>The erosion vulnerability is associated with stormwater outfalls and canals is limited and site-specific in nature.</p>	<p>Some specific locations have a higher “immediate exposure” than others. Overall, St. Lucie County’s exposure to direct economic losses from erosion is moderate. Within the City of Fort Pierce, this exposure is high.</p> <p>Stormwater drainage outfall and canal bank stabilization projects should be evaluated based on site specifics.</p> <p>The annual cost of beach renourishment projects for St. Lucie County has averaged \$2,600,000 over the past 10 years.</p>	<p>Probability: 3</p> <p>Vulnerability: 2</p> <p>Exposure: 2</p> <p>Risk: 2</p>

3 = High
2 = Moderate
1 = Low

Hazard Category	Hazard Evaluation			
	Probability	Vulnerability	Exposure	Risk (Potential for Loss)
Epidemic	The probability of epidemics in St. Lucie County is moderate: Approximately 1 in 1,000 have been infected with AIDS, H1-N1 Flu or West Nile Fever.	St. Lucie County's vulnerability to disease outbreak is higher than many areas of the nation simply because of the amount of tourist traffic that passes through the County.	Due to the large number of retired and elderly people living in St. Lucie County, the countywide exposure to serious impacts from disease outbreaks must be considered moderate.	Probability: 2 Vulnerability: 2 Exposure: 2 Risk: 2
Technological Hazards	The probability of technological hazards in St. Lucie County is low: No significant incidence of technological hazard has occurred in the last ten years.	Countywide vulnerability to technological hazards is low; however, specific areas may vary considerably.	Overall, countywide exposure to technological hazards is low. Specific sub-hazards may very high exposure but are extremely unlikely to occur.	Probability: 1 Vulnerability: 1 Exposure: 1 Risk: 1
Societal Hazards	The probability of societal hazards in St. Lucie County is low: There have been no significant societal hazard incidents in the past ten years.	Countywide vulnerability to societal hazards is low; however, specific areas may vary considerably.	Overall, countywide exposure to societal hazards is low.	Probability: 1 Vulnerability: 1 Exposure: 1 Risk: 1

3 = High
2 = Moderate
1 = Low

SECTION 5

MITIGATION OPTIONS

SECTION 5.0 UPDATES

- Section 5.1: Updated Mitigation Definition and Introduction with discussion
- Section 5.2 Mitigation Categories: Inserted categories from FEMA How-To-Guide
- Section 5.4: Mitigation Option by Hazards: updated opening description paragraph and inserted table.

MITIGATION OPTIONS

This section of the St. Lucie County LMS outlines a menu of mitigation options available to reduce the risks posed by natural disasters.

5.1 MITIGATION DEFINITION AND INTRODUCTION

Mitigation activities are those activities that aim to reduce the risks from natural and man-made hazards in a community. Risk reduction must be tailored to the particular characteristics of the hazard and the surrounding environment. Several factors play a role in the decision on which mitigation activities to pursue. Frequency and severity of the hazard, the community's ability to address the problem, ease of implementation, costs and benefits, availability of funding, and local political and department support are a few of the considerations taken into account when developing a strategy for mitigation of hazards.

There are several different types of mitigation activities that a community can undertake to reduce the risk posed by natural and man-made hazards. Subsection 5.2 lists six broad categories of mitigation actions FEMA has identified as foundation to undertaking mitigation activities. These include prevention, property protection, public education and awareness, natural resource protection, emergency services, and structural projects.

5.2 MITIGATION CATEGORIES

The following category definitions are from the FEMA How-To-Guide #3: *Developing the Mitigation Plan* (FEMA, 2003).

- Prevention – Government administrative or regulatory actions or processes that influence the way land and buildings are developed and built. These actions also include public activities to reduce hazard losses.
- Property Protection – Actions that involve the modification of existing buildings or structures to protect them from a hazard, or removal from the hazard area.
- Public Education and Awareness – Actions to inform and educate citizens, elected officials, and property owners about the hazards and potential ways to mitigate them.

St. Lucie County LMS outreach includes workshops to inform and educate citizens, elected officials, and property owners about the hazards and potential ways to mitigate them. Participation in national programs such as StormReady or Firewise Communities furthers potential for actions that mitigate potential damage. Although this type of mitigation reduces risk less directly than structural projects, it is a supportive strategy. Greater understanding and awareness of hazards and risk among local officials, stakeholders, and the public is more likely to lead to direct actions.

- Natural Resource Protection – Actions that, in addition to minimizing hazard losses also preserve or restore the functions of natural systems.
- Emergency Services – Actions that protect people and property during and immediately after a disaster or hazard event.
- Structural Projects – Actions that involve the construction of structures to reduce the impact of a hazard. Such structures include dams, levees, floodwalls, seawalls, retaining walls, and safe rooms. Actions that involve the modification of existing public or private structures, critical facilities and infrastructure to protect them from hazards, or removal from the hazard area. These actions involve construction of manmade structural projects to directly reduce the impact of hazards.

5.3 MITIGATION OPTIONS BY CATEGORY

The following mitigation options are categorized using the categories identified above. While these lists are not comprehensive, they serve to provide examples of what can be done to reduce risk.

Prevention.

- planning and zoning;
- building codes;
- capital improvement programs;
- coastal zone management regulations;
- density controls;
- design review standards;
- easements;
- environmental review standards;
- floodplain development regulations;
- forest fire fuels reduction;
- open space preservation;
- performance standards;
- shoreline setback regulations;
- special use permits;
- storm-water management regulations;
- subdivision and development regulations; and
- transfer of development rights.

Property Protection.

- acquisition;
- construction of barriers around structures;
- elevation;
- relocation;
- structural retrofits;
- storm shutters; and
- shatter-resistant glass.

Public Education and Awareness.

- outreach projects;
- real estate disclosure;
- hazard information centers; and
- school-age and adult education programs.

Natural Resource Protection.

- best management practices;
- dune and beach restoration;
- forest and vegetation management;
- sediment and erosion control;
- stream corridor restoration;
- stream dumping regulations;
- watershed management; • forest and vegetation management; and
- wetland restoration and preservation.

Emergency Services.

- warning systems;
- emergency response services; and
- protection of critical facilities.

Structural Projects.

- channel maintenance;
- construction of dams/reservoirs;
- construction of levees and floodwalls;
- construction of seawalls/bulkheads; and
- construction of safe rooms.

5.4 MITIGATION OPTIONS BY HAZARD

The following mitigation options broken down by specific hazard, were found mainly in North Carolina Emergency Management's Tools and Techniques: An Encyclopedia of Strategies to Mitigate the Impacts of Natural Hazards (North Carolina Division of Emergency Management, 2002) and FEMA's How to Guide: Integrating Human-Caused Hazards into Mitigation Planning (FEMA, 2002). They represent only a small fraction of the total possible mitigation options available to a community.

This document serves, as a starting point, for gathering ideas and should not be used as the only source for identifying actions. Communities should tailor projects and seek a variety of options for addressing and reducing risks.

The purpose of this section is a resource that communities and stakeholders can use to identify and evaluate a range of potential mitigation actions for reducing risk to natural hazards and disasters. The focus of Section 5 is mitigation - action taken to reduce or eliminate long-term risk to hazards. Mitigation is different from preparedness, which is action taken to improve emergency response or operational preparedness. Below are mitigation options listed by hazard.

All Hazards

- Acquisition and Land Banking;
- Citizen Outreach Programs;
- Community Awareness Programs;
- Development Impact Tax/Improvement Tax;
- Floating Zones;
- Home Inspection Programs;
- Purchase of Development Rights;
- Smart Growth Principles;
- Structural Retrofit;
- Subdivision Ordinance; and
- Tax Abatement, Subsidies, Low-Interest Loans, and Other Incentives.

Drought

- Contingency Planning;
- Fire Breaks;
- Housing Code;
- New Construction;
- Water Conservation Programs
- Monitoring and Warning Programs;
- Drought Tolerant Vegetation; and
- Wildland Fire Mitigation.

Erosion

- Beach Nourishment;
- Dune Protection and Shoreline Setbacks;
- Green Infrastructure;
- Structural Relocation;
- Open Space Preservation;
- Revetments for Beach Management; and
- Vegetation.

Flooding

- Acquisition;
- Elevation;
- Floodplain Management Plans;
- Flood-Proofing;
- Flood Insurance Education;
- Storm-Water Management;
- Green Infrastructure;
- Porous Pavement;
- Retention Ponds;
- Sewage Treatment Plant Retrofit; and
- Tie Downs.

Hurricane

- Acquisition;
- Floodplain Management Plans;
- Flood-Proofing;
- Shuttering;
- Enhanced Building Codes;
- Preparedness Outreach;
- Tree and Limb Maintenance;
- Mobile Home Parks Storm Shelter;
- Safe Rooms; and
- Storm-Water Drain Maintenance.

Thunderstorm

- Drainage System Maintenance;
- Impervious Surface Limits;
- Tree and Limb Maintenance;
- Encourage Flood Insurance;
- Mobile Home Parks Storm Shelter;
- Storm-water Drain Maintenance; and
- Traffic Light and Other Traffic Controls.

Tornado

- Mobile Home Parks Storm Shelter;
- Protecting Natural Environmental Features;
- Warning Systems;
- Enhanced Building Codes;
- Safe Room;
- Tie Downs;
- Traffic Lights and Other Traffic Controls;
- Utility Lines; and
- Wind-proofing.

Wildland Fire

- Fire Breaks;
- Fuel Loads;
- Housing Code;
- New Construction;
- Open Space Acquisition;
- Behavior Fire Behavior Prediction and Fuel Modeling System;
- Prescribed Burns;
- Tree Limb Removal; and
- Wildland Fire Mitigation Planning.

Terrorism

- Site Planning and Landscape Design;
- Architectural and Interior Space Planning;
- Structural Engineering;
- Mechanical Engineering;
- Electrical Engineering;
- Public Education;
- Drills;
- Fire Protection Engineering;
- Security; and
- Parking.

Table 5.1 displays various mitigation activities by both mitigation category and hazard. Only select hazards are compared in the table.

Table 5.1. Mitigation Options by Category and Hazard

Category	Mitigation Alternatives	Hazard			
		Flood	Hurricane	Tornado	Wildland Fire
Prevention	Building Codes	X	X	X	
	Coastal Zone Management Regulation	X	X		
	Density Controls	X	X		X
	Design Review Standards	X	X	X	X
	Easements	X	X		X
	Environmental Review Standards	X	X	X	X
	Floodplain Development Regulations	X	X		
	Floodplain Zoning	X	X		
	Forest Fire Fuel Reduction				X
	Hillside Development Regulation				X
	Open Space Preservation	X	X		X
	Performance Standards	X	X	X	X
	Shoreline Setback Regulation	X	X		
	Special Use Permits	X	X		X
	Storm-water Management Regulations	X			
	Subdivision and Development Regulations	X	X	X	X
	Transfer of Development Rights	X	X		X
Property Protection	Acquisition of Hazard-Prone Structures	X	X	X	X
	Construction of Barriers Around Structures	X	X		
	Elevation of Structures	X	X		
	Relocation Out of Hazard Areas	X	X		X
	Structural Retrofits	X	X		
Public Education and Awareness	Hazard Information Center Public Educational and Outreach Programs	X	X	X	X
		X	X	X	X
	Real Estate Disclosure	X	X	X	X
Natural Resource Protection	Best Management Practices	X	X	X	X
	Dune and Beach Restoration		X		
	Forest and Vegetation Management	X			X
	Sediment and Erosion Control Regulations	X	X		
	Stream Corridor Restoration	X			
	Stream Dumping Regulations	X			
	Urban Forestry and Landscape Management	X			X
	Wetlands Development Regulations	X	X		X
Emergency Services	Critical Family Protection	X	X	X	X
	Emergency Response Services	X	X	X	X
	Hazard Threat Recognition	X	X	X	X
	Health and Safety Maintenance	X	X	X	X
	Post-Disaster Mitigation	X	X	X	X
Structural Projects	Channel Maintenance	X	X	X	
	Dams/Reservoirs	X			
	Levees and Floodwalls	X	X		
	Safe Rooms/Shelters		X		
	Seawalls/Bulkheads		X		

Source: Federal Emergency Management Agency's (FEMA's) *How To Guide 3: Developing the Mitigation Plan* (FEMA, 2003).

5.5 MITIGATION OPTIONS ADDRESSING SPECIAL ISSUES

This section identifies several risk reduction strategies for three special issues of relevance in St. Lucie County - Repetitive Flood Loss Properties, Barrier Islands, and the Community Rating System Program (CRS).

5.5.1 Repetitive Flood Loss Properties

St. Lucie County has placed special emphasis on addressing repetitive flood loss properties through the mitigation planning process. This subsection identifies strategies to lower the number of repetitive loss properties within the County. The following are examples of actions that can be taken to lower or eliminate both the number of repetitive loss claims and properties in the County.

- Acquisition;
- Building Codes;
- Detention Basins;
- Drainage Culverts;
- Drainage System Maintenance;
- Dune Protection and Shoreline Setbacks;
- Elevation;
- Firebreaks;
- Floating Zones;
- Floodplain Management Plans;
- Flood Proofing;
- Moratoria;
- Real Estate Disclosure Requirements;
- Relocation;
- Sewage Lift Stations; and
- Storm-Water Drainage Maintenance

5.5.2 Barrier Islands

Geologic and meteorological processes associated with barrier islands create a number of potential hazards. The following actions are examples of mitigation activities that can be implemented to protect the people, buildings, and infrastructure on barrier islands before and during natural hazard events.

- Acquisition;
- Beach Management Plans;
- Beach Nourishment;
- Carrying Capacity;
- Dredging;
- Dune Protection And Shoreline Setbacks;
- Floating Zones;
- Groins;
- Jetties;
- Offshore Breakwaters;
- Revetments;
- Roadway Realignment;
- Sand Dunes;

- Sand Scraping;
- Seawalls And Bulkheads; And
- Coastal Sediment Trapping And Vegetation

5.5.3 Community Rating System (CRS) Projects

Participation in the CRS program can reduce Flood insurance premiums up to 45% for residents within St. Lucie County. The number of mitigation actions that reduce the impacts of flooding is directly related to lower insurance premiums. The following subsection outlines example mitigation activities qualifying St. Lucie County for potential premium-reducing CRS points.

- **310 Elevation Certificates** - elevation;
- **320 Map Information Service**;
- **330 Outreach Projects** - audits of small business, community awareness programs, education and training, home inspection programs, and notification of location of hazards;
- **340 Hazard Disclosure** - real estate disclosure requirements;
- **350 Flood Protection Information**;
- **360 Flood Protection Assistance**;
- **400SH Special Hazard Areas** - beach management plans, dune protection and shoreline setbacks, sand dunes, sediment trapping vegetation, and wetland preservation and riparian habitat protection;
- **410 Additional Flood Data** - hazard identification, mapping hazards, risk assessment, and vulnerability assessment;
- **420 Open Space Preservation** - acquisition and comprehensive plans;
- **430 Higher Regulatory Standards** - building codes, government expenditure limitation in high hazard areas, moratoria, sewage lift station, and sewer manholes;
- **430 LD Land Development Criteria**;
- **430 LZ Low Density Zoning** - development density;
- **450 Storm-water Management** - grassy swales, impervious surface limits, on site sediment retention, performance or impact zoning, retention ponds, storm-water management, and vegetation;
- **502 Repetitive Loss Requirement**;
- **510 Floodplain Management Planning** - floodplain management plans, hazard mitigation and post-disaster reconstruction, porous pavement, and storm-water basins;
- **520 Acquisition and Relocation** - acquisition, capital facilities plans, commercial parks, critical facilities, emergency shelters, parks, public housing, public records, relocation, safe site, and school facilities;
- **530 Flood Protection**- dikes, levees, floodwalls and berms, elevation, Flood proofing, public housing, public records, public school buildings, retrofit of fire stations and police stations, and sewage treatment plan retrofit;
- **540 Drainage System Maintenance** - drainage culverts, drainage system, maintenance, retention ponds, and storm-water drain maintenance;
- **610 Flood Warning Program** - capability analysis and disaster warning;
- **620 Levee Safety** - dikes, levees, floodwalls, and berms; and
- **630 Dam Safety** - dams and reservoirs.

5.6 MITIGATION IN DEPTH

Section 2.0, Community Profile has shown continued growth in the Treasure Coast region and 2020 estimates indicate continual increase in population growth. Population growth has a major impact on how and where development takes place in the County. As new development moves outward from the urbanized core and corridors, the potential for natural hazards to impact life and property increases. Because growth issues are so prevalent in the County, select development related mitigation activities have been identified and are described below. These activities are provided as examples only, and they are not reflective this list is in no way exhaustive of the broad spectrum of mitigation options available. The mitigation activities and the accompanying information were developed from North Carolina Division of Emergency Management in the Tools and Techniques document (North Carolina Division of Emergency Management, 2002).

5.6.1 Floating Zoning

5.6.1.1 Definition

Floating zones are written into the zoning code but "float" above the map until triggered by a set of conditions. Unlike overlay zones, floating zones replace the existing code for the places in which they are implemented. Once certain conditions (usually development-related) are met, the ordinance becomes affixed to a particular site. Floating zones are typically used when a community knows that it wants to apply a set of regulations to certain uses (such as a shopping center), but is waiting for events to decide the location for those uses.

5.6.1.2 Implementation

Floating zones can be used to reduce density in areas that have been impacted by a natural disaster. Areas where structures have sustained damages, on average, a certain degree of damage could anchor a floating zone that reduces allowable density in that area. The damage zones where these regulations would be applied could be identified during the disaster recovery phase.

5.6.1.3 Critique

Since one or several lots are subject to different regulations than their neighbors, floating zones are often assumed as being a form of spot zoning. While the location of floating zones can be subject to special interests and politics, they are usually based on facts, as opposed to speculated future needs.

5.6.2 Impact Fees/System Development Charges

5.6.2.1 Definition

Impact fees require new developments to share in the financial burden that their arrival imposes on a town or city. These assessments are typically a one-time, up-front charge (although some jurisdictions allow installment payments) against new development to pay for off-site improvements. The fees also can be set up to allow new development to buy into existing services with excess capacity. Impact fees are typically based on ratios that show what services the average new resident will require.

5.6.2.2 Implementation

Every impact fee must meet a three part legal test. First, the need for improvements that the fee will cover must be created by the new development. Second, the amount charged the new development must be proportionate to the cost of its use, and third, all revenues must be spent in proximity to the new development and within a reasonable period of time. If any of these are not met, the community may face legal action. Communities should have a comprehensive plan and capital improvements program in place to defend their use of impact fees or exactions.

Impact fees can be linked to environmental impact analyses in order to charge proportionate fees for projects that will have broader or lesser impacts. While there are several methods for analyzing impacts (checklists or spreadsheet models, for example), most look only at individual project impacts. An alternative is a cumulative impact assessment, which looks at the total effect of all development in a particular environment. This approach might allow planners to estimate the combined effects of several potential developments on reducing the flood storage capacity of a single watershed. The fee in this case would go toward mitigating increased flood heights, perhaps by creating flood storage elsewhere in the floodplain.

5.6.2.3 Critique

Besides exactions or special assessment districts, impact fees can be applied to a wide variety of services. Unlike land dedications, these can be payments that cover the full costs of needed improvements. They are typically used in place of negotiated exactions because they take less time and are more predictable and equitable. Impact fees do not help with maintenance costs.

5.6.3 Porous Pavement

5.6.3.1 Definition

Substitute porous or open-grid pavement for impervious pavement to limit the amount of storm-water runoff that contributes to localized flooding.

5.6.3.2 Implementation

Pavement will ideally be pervious enough to absorb rainfall but with pores small enough not to clog with debris or cause problems for pedestrian traffic. Some brands of asphalt or concrete that lack the finer sediment of conventional cement hold promise. Several websites containing photographs and/or useful information regarding porous and open-grid pavement include:

- http://www.gcpa.org/pervious_concrete_pavement.htm; and
- <http://www.greenbuilder.com/sourcebook/PerviousMaterials.html>.

5.6.3.3 Critique

Reservations apply to the use of open-grid, or open-cell, pavement: it is treacherous for those with mobility challenges (and those in high heels) and in addition, is expensive to install. However, open-grid pavement is appropriate for limited-use access routes or overflow parking lots.

5.6.4 Transfer of Development Rights (TOR)

5.6.4.1 Definition

Like Purchase of Development Rights (PDR), TDR programs treat development as a commodity separate from the land itself.

Local governments first award each property owner in a sending area a set of development rights based on the value or acreage of land. Sending areas contain land the local authority seeks to protect. The government then establishes a receiving area for these rights that is a preferred site for development. Landowners in the sending area are typically prohibited from developing their land; however, they can sell their rights to developers in the receiving areas. Developers who acquire these development rights can build to higher densities than would otherwise be permissible.

5.6.4.2 Implementation

TDR could be used for mitigation purposes by designating high hazard areas as sending zones. The development rights for parcels within this zone would be targeted at a receiving zone located outside the hazard area. The zone would need to have sufficient room to accommodate the sending rights. In jurisdictions with limited available space, the program could be aimed at redevelopment rather than new development. Alternatively, the community could completely downzone itself. Both options could help create a market for development rights.

One way to ensure that people participate in the program is to make it mandatory; although, the legality of mandatory TDR programs is currently under challenge. In a mandatory program, the marketability of the rights would have to be guaranteed. One way to do so would be to create a municipal land bank that would purchase the rights and resell them when demand was sufficient to generate value. Suitable receiving areas outside the hazard area must be available for TDR to be successful. TDR can be used to achieve a variety of associated community goals, including promoting compact development with less impervious surfaces and preserving agricultural, rural, or open spaces. Since TDR can be applied to areas of a community, rather than individual parcels, it can be more thoroughly effective than acquisition or cluster development techniques.

5.6.4.3 Critique

TDR is a complex system which makes it difficult for planning staffs to implement and for landowners to understand and accept. It is frequently unpopular with residents in the receiving zone, who are subject to development that exceeds the apparent zoning limits. Perhaps most importantly, a region must have a significant amount of development pressure to make the rights marketable.

5.6.4.4 Example

Collier County, Florida began a TDR program in the 1980's to protect 40,000 acres of coastal barrier islands, mangroves, salt marshes, and beaches. These areas were designated as sending zones. The receiving zones were already set for multi-family housing, but could be built to a higher density using the development rights. Parcels for which the development rights have been sold must be protected by a restrictive covenant or by donation to the County or a conservation organization. A moratorium was placed on the program when the transfer resulted in density concentrating in only one receiving site and overwhelming it.

SECTION 6

IMPLEMENTATION PROGRAM

SECTION 6 UPDATES

- Section 6.1: Added language to Introduction
- Section 6.2.1: Updated Organizational Structure with lead and administrative support responsibility to the LMS Coordinator, Division of Emergency Management
- Section 6.2.2: Updated Administrative Lead Responsibilities
- Updated plan monitoring process
- Changed Forms 1, 2 and 3
- Changed update procedures
- Table 6.1: Formatted PPL Scoring Factors and Weights
- Table 6.2: Revised and inserted Prioritized Project List
- Section 6.3: Implementation Strategy, Updated subsection Goals and Objectives
- Replaced Director of Public Safety with LMS Coordinator throughout Section 6. Added LMS Coordinator where responsibility was appropriate
- Section 6.7: Continuing Public Involvement; updated process and notification
- Section 6.8: Conflict Resolution updated review of example documents, added Treasure Coast Regional Planning Council

6.0 IMPLEMENTATION PROGRAM

6.1 INTRODUCTION

The LMS program relies on plan implementation as the cornerstone of success, plan update, project update and prioritization are cyclical and reinforce the goals and objectives of the local government's comprehensive planning, hazard mitigation and the creation of resiliency in the wake of disaster. Without an implementation program, either the Plan "gathers dust on the shelf" or lags along implementing projects incrementally, based more on agencies or individuals' interest than on a prioritized need basis. Discussed below are issues related to the organizational arrangement and administrative responsibility, the role of the Steering Committee, plan monitoring, plan funding, and plan update processes.

6.2 INSTITUTIONAL ARRANGEMENT

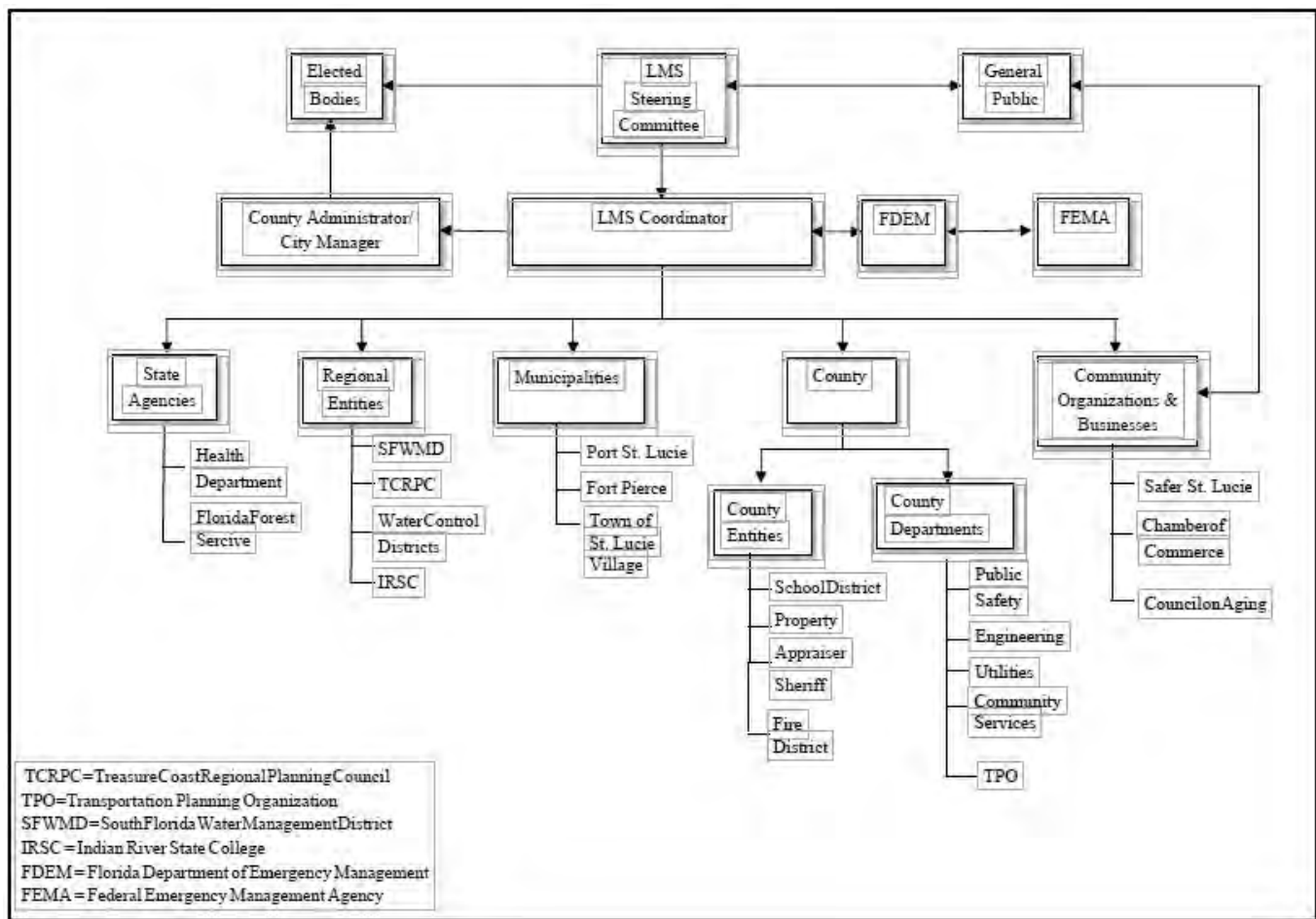
Effective implementation requires the strong support of the locally elected body, dedicated staff to maintain documentation and understanding within the stakeholder groups and the public. The creation of a disaster-resistant community is achieved once the concept becomes part of the mindset and fabric of the private and public sectors of a community. It requires an advocate, someone or a group who believes the issue to be essential to the long-term sustainability of the community. This individual or group of individuals is represented by the LMS Coordinator, the Steering Committee, the stakeholder groups, and the public. The LMS Coordinator and the Steering Committee continually reassess the vulnerabilities of the community, and identifying potential strategies and partners to address the vulnerabilities and means to affecting change whether it is a brick and mortar project or implementing a new programmatic initiative or modification to existing codes or plans.

This section describes the comprehensive organizational arrangement required to effectively implement the countywide LMS program. It also describes the administrative framework that defines the roles and responsibilities of those at the staff level that carry out activities on a daily basis that lead to the implementation of the LMS.

6.2.1 Organizational Structure

The LMS organizational structure consists of several levels (see Figure 6.1, LMS organizational structure). Heading the effort is the LMS Steering Committee. This group must have broad representation to be effective. It should embrace all stakeholder groups in the County from both the public and private sectors. Therefore, when the St. Lucie County Steering Committee was created, representative participants were chosen so that all affected groups would have representation in the planning process and in the ongoing implementation of the LMS. The Steering Committee interacts directly with the County Commission, other respective Boards and Councils and the public. The St. Lucie County Department of Public Safety, Director provides direct staff support from the Division of Emergency Management to the Steering Committee and its Chairperson. The Emergency Management Coordinator serves as the designated LMS Coordinator and is the liaison to the Florida Division of Emergency Management (FDEM), and the Federal Emergency Management Agency (FEMA).

Figure 6.1 – LMS Organizational Structure



6.2.2 Administrative - Lead Responsibility

As described in Section 6.2.1, The Department of Public Safety is the lead agency responsible for overseeing the Division of Emergency Management ensuring the implementation of the LMS program. The individual having lead responsibility for is the Emergency Management Coordinator who serves as the LMS Coordinator to the Chair of the Steering Committee, Stakeholder Groups, communities and the local governments that this LMS serves. It is important that the LMS Coordinator and Department of Public Safety Director interact with the County Administrator on a frequent basis, reporting on the progress of the implementation program, obstacles or problems that have delayed the implementation program, and ideas or alternative options to overcome the obstacles and/or problems being encountered.

Responsibilities of the LMS Coordinator will:

- Serve as the hazard mitigation advocate at staff level;
- Keep current with all changes in LMS/DMA2K programs and communicates those changes to the Steering Committee;
- Interact frequently with the Florida Division of Emergency Management;
- Serve as the LMS County Liaison;
- Work closely with the LMS Chairperson;
- Organize meetings of the Steering Committee;
- Coordinate with and contact all members of the Steering Committee on a regular basis;
- Maintain avenues of communication with the general public;
- Set up and maintain files documenting progress of LMS program;
- Update the PPL as needed; and
- Conduct the comprehensive 5-year LMS update.

6.2.3 Administrative - Support Responsibility

Successfully implementing the LMS is not the sole responsibility of the Department Of Public Safety, Division of Emergency Management; it is the responsibility of all participating organizations. Participating organizations from both the public and private sectors can fulfill administrative responsibilities in a number of ways including:

- Promote and educate others about the significance of local hazard mitigation;
- Interact and coordinate frequently with the LMS Coordinator;
- Manage mitigation projects or activities;
- Provide assistance to other organizations so they can implement their mitigation projects or activities;
- Disseminate hazard mitigation-related information to constituents;
- Document the progress of one's organization's hazard mitigation activities; and
- Make available to LMS Coordinator new data and information relevant to the LMS process.

An example of providing support to other organizations could involve assisting in an all-hazard public awareness/education program. Other participating public organizations and even homeowner associations should serve in a support role to publicize and disseminate the program information generated to improve public awareness and program education and attend educational workshops, seminars and Steering Committee meetings.

6.3 IMPLEMENTATION STRATEGY

The implementation strategy is based on information gathered from the Steering Committee as well as key community stakeholders and citizens. The hazards and community issues identified as well as the community's institutional analysis are used to determine the best means to implement mitigation strategies in St. Lucie County. The implementation strategy includes the goals and objectives identified by the Steering Committee as well as a list of prioritized mitigation activities.

6.3.1 Goals and Objectives

In formulating the goals and objectives, appropriate plans, policy statements, laws, codes, and ordinances from each participating local government have been reviewed. With multiple local governmental entities involved in defining a community-wide vision, this becomes a complex process. To help clarify the process, a facilitated discussion with the Steering Committee was conducted, and a comprehensive list of the areas where disasters affect the community was developed. The list included the following:

- Loss of life;
- Loss of property;
- Community sustainability;
- Health/medical needs;
- Temporary sheltering;
- Food and water;
- Communication;
- Housing;
- Historical structures;
- Adverse impacts to natural resources (e.g., beaches, water quality);
- Economic disruption;
- Fiscal impact;
- Recurring damage;
- Damage to repair to public infrastructure (e.g., roads, water systems, sewer systems, storm-water systems, electrical power);
- Debris removal;
- Redevelopment/reconstruction;
- Development practices;
- Environmental damage;
- Intergovernmental coordination; and
- Mental health counseling.

Along with these general hazard impacts, specific issues related to preparing for, mitigating against, responding to, and recovering from disasters were identified by the Steering Committee. The issues identified are summarized below.

Flooding

- Large number of smaller contiguous rain events stacked on top of each other can aggravate local flooding, ground saturation will increase standing water but also increase speed of moving water;
- Maintain coordination with Army Corps of Engineers on St. Lucie Canal and Lake Okeechobee water levels;

- Flood events impact fisheries and tourism industries;
- Elevating homes alone will not solve the problem; must elevate all features, roads, fire hydrants, etc.;
- Need to accurately model the predicted impact of increased impervious land in County due to development;
- Need to better coordinate the drainage between neighboring subdivision;
- Need to maintain canals;
- Need to determine what an acceptable impact is (e.g., Flooded homes? Flooded roads?);
- Residents need to be made aware of the potential for flooding;

Hurricanes/Tropical Storms

- Assess St. Lucie County public facilities for strength and identify hardening needs.

Wildland Fire

- Wildland fire mitigation needed on Lots 5 or 6 on Suzanne Drive, owned by the City of Fort Pierce Public Works.

Erosion

- Continued beach re-nourishment - City of Fort Pierce.

Emergency Shelters

- Many churches serve as kitchens to serve meals following disasters. These facilities need wind protection;
- Impact of evacuees from other counties;
- Education on when to evacuate to a shelter and when to shelter-in-place;
- Pet friendly shelters needed; and
- Some shelters are in need of generator hook-ups and generators.

Technological Hazards

- A train derailment in downtown Fort Pierce would impact the City government building and functions;
- Train derailments cause traffic impediments because main east-west corridors become blocked; and
- These concerns, along with information generated from the inventory of local planning documents and ordinances, resulted in the following goals and objectives for all hazards mitigation planning in St. Lucie County.

The St. Lucie County LMS Steering Committee identified the following goals and objectives. The goals and objectives were selected because of their ability to address community issues that were identified earlier in the mitigation planning process. Goals as defined by FEMA are general guidelines that explain what you want to achieve. They are usually broad policy statements and are long-term in nature. Objectives as defined by FEMA are strategies or implementation steps to attain the identified goals. Unlike goals, objectives are specific and measurable. The goals and objectives define the broad direction of the mitigation strategy and

provide the focus for developing and adopting mitigation projects and activities.

Goal 1: Reduce the loss of life and property

- Objective 1.1 Reduce flooding and/or wind damage.
- Objective 1.2 Eliminate or retrofit repetitive loss properties.
- Objective 1.3 Retrofit and/or construct new critical facilities.
- Objective 1.4 Protect and restore areas susceptible to erosion.
- Objective 1.5 Improve local roadways to ensure safe, efficient, evacuation.
- Objective 1.6 Reduce the potential threat of fires, wildland and structural.
- Objective 1.7 Increase public awareness of hazards and their impacts.
- Objective 1.8 Evaluate codes, policies, ordinances, and regulations for natural hazards.
- Objective 1.9 Reduce exposure to potential environmental hazards.

Goal 2: Achieve safe and fiscally sound, sustainable communities.

- Objective 2.1 Integrate hazard reduction into local planning and development processes.
- Objective 2.2 Enhance environmental quality and/or function of natural resource.
- Objective 2.3 Prepare informational materials explaining the positive relationship between sustainable communities and disaster-resistant and resilient communities.
- Objective 2.4 Create and maintain current an all-hazards database.
- Objective 2.5 Promote implementation of cost-effective mitigation projects.
- Objective 2.6 Enhance geographic information system (GIS) capabilities for use in hazard analysis.

Goal 3. Facilitate orderly recovery during post-disaster redevelopment.

- Objective 3.1 Create more resilient disaster-resistant businesses.
- Objective 3.2 Ensure economic viability of the local business community following disaster events.

Goal 4. Optimize the effective use of all available resources.

- Objective 4.1 Establish public/private partnerships.
- Objective 4.2 Establish procedures strengthening intergovernmental coordination and cooperation.

6.4 INTEGRATION INTO LOCAL PLANS

Hazards are pervasive throughout our local communities. While it is understood that the issue of hazard mitigation is a central focus of the LMS, there are other planning mechanisms where this important issue should be addressed. Issues of land use, infrastructure, and environment have been addressed in local comprehensive plans; however, few plans properly address the impact disasters may have on existing and future development. Disasters have enormous physical and social impacts on the community. Other types of planning mechanisms where hazards should be addressed include county and city CEMPs, Continuity of Operations Plans (COOP), Flood mitigation plans, State Housing Initiative Partnership Program (SHIP), and Local Development Review (LDR). Disaster planning is relevant to historic resources, waterfront development, community redevelopment, and low income neighborhoods where substandard housing is typically found has resulted due to use of poor construction methods and materials, and/or lack of adequate maintenance by the homeowner.

From a regulatory standpoint, local government comprehensive plans administered under the provisions of Section 163.3161, Florida Statutes are the cornerstone of growth management in Florida. Being supported by force of law, local comprehensive plans are extremely important vehicles to implement hazard mitigation. Local governments under Section 163.3161, Florida Statutes, are required to update their capital improvement plans (CIPs) annually. The projects included on the LMS PPL also should be incorporated into the local comprehensive plan CIPs. This should be accomplished annually in keeping with the annual update of the jurisdiction's list of projects.

The LMS Steering Committee meets quarterly. It is anticipated that one of the quarterly meetings will focus on integrating hazard mitigation into comprehensive plans. At that meeting, ideas will be shared about how successes were achieved and obstacles overcome.

6.4.1 The Integration Process

The following process will be followed to ensure widespread integration of hazard mitigation into local planning mechanisms in St. Lucie County.

1. An invitation from the LMS Chair, along with a letter of support from the chair of the Steering Committee, will be transmitted to local organization and planning heads and directors, inviting each to attend an LMS Steering Committee meeting to discuss ways in which hazard mitigation can be best integrated into planning matters.
2. Meeting of the LMS Steering Committee is held. This phase could be said to be the institutionalization of hazard mitigation into the local planning and development.
3. Each director will be asked to work with their planning staff to develop a strategy to integrate hazard mitigation into their planning programs and to evaluate whether their regulations address hazard mitigation, identify gaps, then seek possible alternatives.
4. At the next meeting of the LMS, directors will report their situation to the LMS Steering Committee.
5. Identified changes will be made through the plan amendment process. Refer to Section 163.3187, Florida Statutes, and Chapter 9J-11; F.A.C. Local governments can seek plan amendments twice each year.
6. This is the preferred approach because the formal, legally mandated Evaluation and Appraisal Report process in which local comprehensive plans undergo extensive review and scrutiny and modification occurs every seven years.

A similar process as described in Points 1-5 (above) will be taken by the LMS Steering Committee to study the feasibility and implementation mechanics relative to other planning processes active in the County such as the Transportation Planning Organization (TPO), important in addressing transportation matters and SHIP, which is active with low-income housing issues. Historical resources also will be evaluated, since there are a number of historical structures in risk areas in the County.

6.5 PLAN MONITORING

Once the participants adopt the LMS, monitoring the progress of plan implementation is extremely important. It is through the monitoring process that the Steering Committee can determine whether implementation is occurring as originally envisioned. Determining whether the implementation timeframes are being met is critical. The monitoring process may be more important in identifying why actions/initiatives are not occurring. The identification of obstacles to implementation also is important, for example, funding cutbacks, unsuccessful grant applications, and staff changes (e.g., key individual resigns or reassigned to new job, unexpected design problems, unexpected complexity in securing permits, lose commitment of partner agencies/organizations). Having an understanding of the timing and flow of projects as well as the availability of funding sources and community support also is key to successfully implementing the identified strategies. Certain events or circumstances can alter the traditional means of operation and implementation. For instance, the events of September 11th significantly impacted the way emergency management functions on federal, State, and local levels.

6.5.1 Process

- Step 1 Each quarter, the designated point-of-contact for each individual mitigation project or initiative identified on the PPL will report progress to the St. Lucie County LMS Coordinator. For the first and third quarters, the point-of-contact will complete an Individual Project Progress Report ([Appendix C](#)) for each project and submit it to the St. Lucie County LMS Coordinator. For the second and fourth quarters, an informal progress check-in will take place between the point-of-contact and the St. Lucie County LMS Coordinator. The point-of-contacts also will be responsible for submitting any supporting documentation such as newspaper articles or other relevant media.
- Step 2 Based on the submitted progress report forms and progress check-ins, the St. Lucie County LMS Coordinator will complete quarterly progress reports for the overall LMS program and submit them to the elected boards of the County and municipalities.
- Step 3 At the end of each year, the St. Lucie County LMS Coordinator will prepare an LMS Annual Report. The Annual Report will be submitted to the elected boards of the County and municipalities.
- Step 4 Besides reporting to local governments, the St. Lucie County LMS Coordinator and/or Chair of the LMS Steering Committee will be available to make similar presentations to private sector organizations, non-profit organizations (e.g., Council on Aging, Chambers of Commerce) and community organizations.

6.6 UPDATING THE PLAN AND PROJECTS LIST

There are two updating processes connected to the LMS. One describes how the Prioritized Project List (PPL) is updated annually. A detailed description of the PPL updating procedure is provided below. The second updating process, involves the 5-year update of the Plan sections of the LMS.

At the heart of the LMS is the PPL (see Table 6.1). The PPL is a rank order of priority projects that if implemented will result in a more disaster-resistant and resilient community.

When current projects are completed, new needs surface, new funding opportunities arise, and events occur that affect priorities, it is important that the PPL be a dynamic document. For this reason, the window to submit projects to the PPL is always open. All applicants desiring to have their project on the PPL must submit their proposed project utilizing the Mitigation Measure (Project or Initiative) Proposal Form ([Appendix C](#)). The following sections identify the multi-step prioritization methodology.

6.6.1 Project Prioritization Process

St. Lucie County LMS Mitigation Measure (Project or Initiative) Proposal Form is located in Appendix C

6.6.1.1 Prioritization Process

The Steering Committee determined proposed LMS mitigation projects and activities are to be evaluated and prioritized based on the following scoring system and procedures:

1. Projects will be scored only on the basis of documents submitted by the individual or agency proposing the mitigation project.
2. Projects may be submitted to the LMS Steering Committee at any time. Organizations are encouraged to do so as soon as the need is identified. However, projects of a time-sensitive nature, such as HMGP projects requiring LMS Steering Committee ranking, shall be submitted to the LMS Coordinator no later than one month in advance of when the LMS Steering Committee ranking is due.
3. Each project will be scored on the eleven Scoring Factors listed in Table 6.2
4. Each Scoring Factor is assigned point criteria ranging from 0 to 3.
5. Each Scoring Factor is assigned a weight. The weight indicates the relative importance of each Scoring Factor.
6. To determine a project's score on each scoring factor, the number of points is multiplied by the weight.
7. A project's total score is the sum of the scores of the eleven Scoring Factors. The highest possible score is 120.

Table 6.1: PPL Scoring Factors and Weights

SCORING FACTOR		POINT CRITERIA	WEIGHT	POINTS	SCORE
1	Consistency with LMS Goals		4		
		3- Addresses the highest LMS goal (reduce the loss of human life through provision of sheltering, evacuation, disaster preparedness, emergency response, hazard mitigation, or other services.)			

		2- Addresses the second highest LMS goal (To ensure orderly, effective, short-term Recovery and redevelopment by establishing a program that provides adequate shelters, community health services, food and water, debris removal and promotes rapid economic recovery following a disaster.)			
		1 – Addresses at least one of the three lowest LMS goals A. (To minimize public and private exposure to loss of property and economic disruption in the event of natural, technological, and societal hazards.) B. (To achieve safe and financially sound, sustainable communities through thoughtful long range planning of natural and man-made environment) C. (To optimize the effective use of all available resources by establishing public/private partnerships and by promoting intergovernmental coordination and cooperation.)			
		0- Fails to address any of the listed LMS goals.			
2	Consistency with Hazard Impact		4		
		3- Addresses at least one of the three highest hazards A. Wind Event (Hurricane, Tornado, Tropical Storm) B. Flooding C. Epidemic			

		2- Addresses at least one of the three second highest hazards: A. Terrorism/Sabotage B. Hazardous Materials Accident, Wellfield /Surface Water Contamination C. Wildfire			
		1 – Addresses at least one of the remaining hazards: A. Radiological Hazard B. Power/Communication Failure C. Transportation System Accident D. Drought E. Erosion F. Agricultural Pest/Disease G. Civil Disturbance			
		H. Extreme Temperature I. Immigration Crisis J. Military Ordinance K. Seismic (Sinkholes, Earthquakes) L. Thunderstorm/Lightning			
		0- Fails to address any LMS listed disasters			
3	Consistency with Laws and/or Policies		2		
		3- Consistent with existing laws/policies			
		2- New legislation or policy changes needed, but no conflicts identified			
		1- New legislation or policy changes needed, but may conflict with existing laws, regulations, and/or policies			
		0- Inconsistent with laws and/or policies			
4	Consistency with Local Plans		4		
		3- Supported in both the Comprehensive Emergency Management Plan and a jurisdiction's Comprehensive Plan			
		2- Supported in either the Comprehensive Emergency Management Plan or a jurisdiction's Comprehensive Plan			
		1- Supported in other government plan			
		0- Not supported in any government plan			

5	Scope of Benefits – Jurisdictions		4		
		3- Benefits the health and safety of all Municipalities and the unincorporated county			
		2- Benefits the health and safety of 2 to 3 jurisdictions (municipality or the unincorporated county)			
		1- Benefits the health and safety of 1 jurisdiction (municipality or the unincorporated county)			
		0- Provides no significant benefits to any jurisdiction			
6	Scope of Benefits – County		4		
	Population				
		3- Benefits 67% to 100% of the County population			
		2- Benefits 33% to 66% of the County population			
		1- Benefits 1% to 32% of the County population			
		0- Provides no significant benefit			
7	Importance of Benefits – Essential Services		4		
		3- Needed for essential services: Medical, Shelter, Custodial Care, Educational, Emergency, Utility, Police, Food			
		0- Not needed for essential services			
8	Importance of Benefits – Critical Facilities		4		
		3- The project facility is a designated primary critical facility			
		2- The project facility is a designated secondary critical facility			
		0- The project facility is not a designated critical facility			

9	Benefit/Cost Ratio		2		
		3- 4.0 or higher			
		2- Between 2.0 to 3.9			
		1- Between 1.0 to 1.9			
		0- Less than 1 or a formal analysis has not been completed			
10	Financing		4		
		3- Eligible for more than one grant and is scheduled for future funding in jurisdiction's approved budget or capital plan			
		2- Eligible for grant funding from at least two grant sources			
		1- Eligible for grant funding			
		0- Not scheduled for funding in jurisdiction's approved budget or capital plan and is not			
		eligible for grant funding			
11	Time Necessary for Implementing		4		
		3- Less than 2 years			
		2- 2 to 3 years			
		1- 3 to 4 years			
		0- Greater than 4 years			

6.6.1.2 Tie Break Methodology

This project prioritization methodology may result in tie scores for projects that address the same hazards. For instance, most storm-water management projects will address the same goals and hazards, perhaps resulting in tie ranking scores. Because of this, it is important to develop a tie-break methodology.

1. For projects with identical ranking scores that address different LMS Goals, the project that addresses the highest LMS Goal shall be ranked higher.
2. For instance, if a tornado project and a hazardous materials accident project received identical ranking scores, the tornado project would be ranked higher because overall hazard priority is higher than hazardous materials accidents. For projects with identical ranking scores that address identical LMS Goals, the project that addresses the highest ranked hazard shall be ranked higher.
3. For projects with identical ranking scores that address the same LMS Goals and the same hazards, the project that serves the greatest percent of the County's population shall be ranked the highest.

4. For projects with identical ranking scores that address the same LMS Goals, the same hazards and the same percent of the County's population; the project that has the highest benefit cost analysis shall be ranked the highest.

6.6.2 Comprehensive Update

The LMS planning process is dynamic and results in the development of a set of prioritized projects and initiatives with the aim of mitigating hazard impacts. To ensure this Local Mitigation Strategy is consistent with current community issues and characteristics, it is important that it be periodically reviewed and updated. During preparation for LMS meetings and agenda preparation, The LMS Coordinator as Chairman of the Steering Committee, and the Co-Chairman will solicit requests for changes to each jurisdiction's mitigation projects and/or strategies from participating jurisdictions as part of the steering committee meeting process. At each meeting the LMS is evaluated for any needs for changes. The LMS Coordinator evaluates the plan prior to meetings, in order to recommend any changes needed. All jurisdictions and participating parties are able to submit projects for consideration at any time.

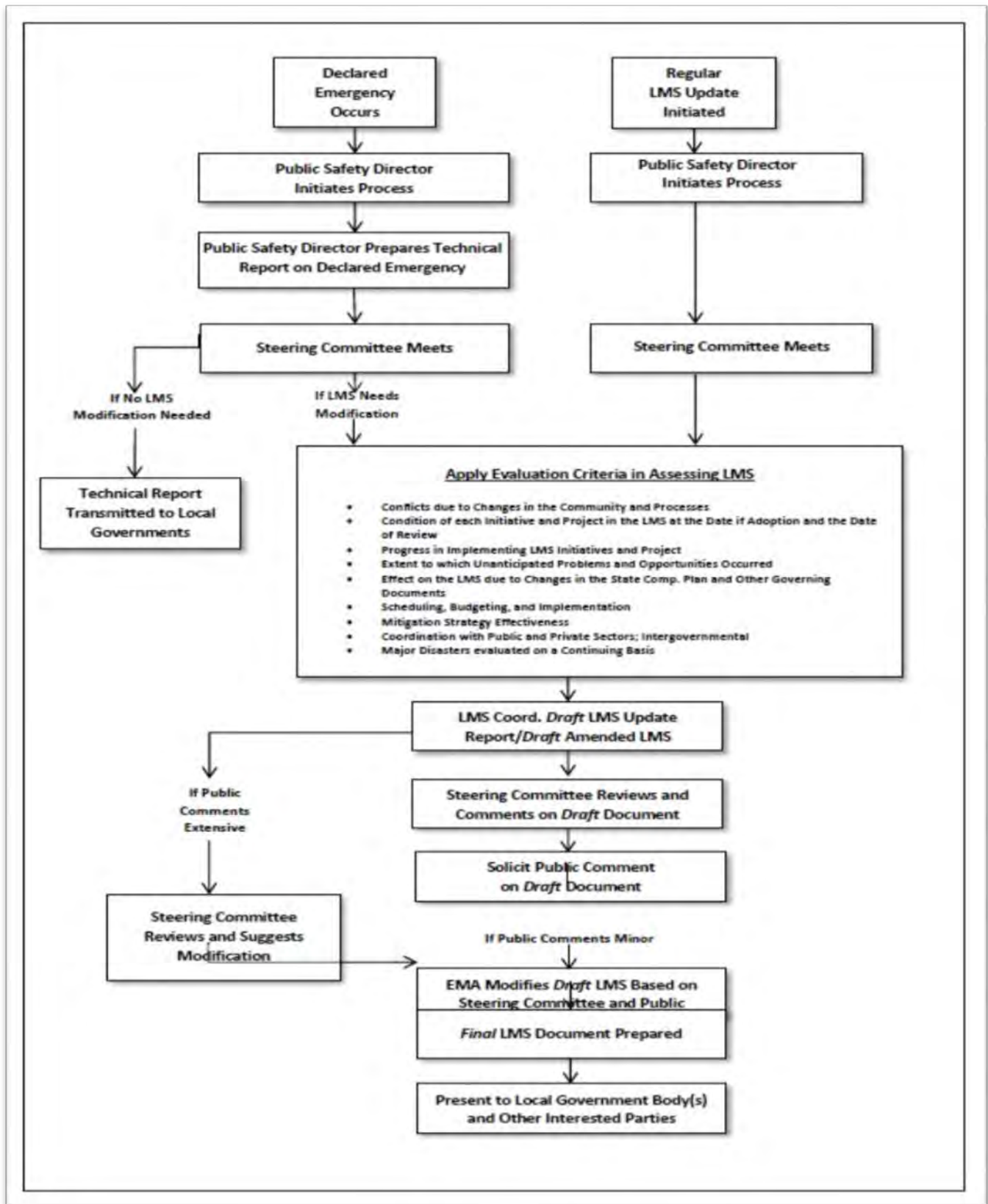
In developing this updating process, three key sources were consulted to shape the process and procedures developed herein:

- Section 163.3191, Florida Statutes,
- the evaluation and appraisal process of local government comprehensive plans; and
- FEMA Local Mitigation Planning Handbook.

A key objective in the development of the process was to keep it from being excessively bureaucratic and cumbersome.

The LMS update process will occur on a 5-year cycle as is recommended by FEMA's DMA2K. The Steering Committee indicated that there needed to be some abbreviated reassessment of the Strategy following a Disaster Declaration. The LMS update procedures will be initiated and carried out by the Director of St. Lucie County's Department Of Public Safety. The Director's responsibility is to ensure that the following update procedures are implemented in a timely manner. Both the regular, 5-year, Strategy update processes, as well as the abbreviated review process applicable following a Disaster Declaration, are depicted in Figure 6.2.

Figure 6.2 - Review and Revision Procedures for Updating Local Mitigation Strategy



6.6.2.1 Comprehensive Update Procedures

The regular updating process will occur every 5 years. The administrative steps, as described below, constitute the procedures that will be followed.

- Step 1 The LMS Coordinator of the Division of Emergency Management will activate the update process in January of the fourth year of the update cycle by notifying each member of the Steering Committee of an initial organizational meeting. At that time, the LMS Coordinator will request information updates on those serving on the Steering Committee (name of person, address, telephone and fax number, and e-mail address, if available).
- Step 2 The LMS Coordinator prepares meeting agenda in coordination with the Chairman of the Steering Committee to be distributed in advance of the meeting to members of the Steering Committee.
- Step 3 Steering Committee meeting is held. A brief review of the updating process is discussed. There will be a discussion of whether the evaluation criteria are still appropriate or whether modifications or additions are needed due to change of conditions over the period since the last update process occurred. The data needs will be reviewed, data sources identified, and responsibility for collecting information will be assigned to members.
- Step 4 A draft report will be prepared. Evaluation criteria to be addressed include the following:
- Changes in the community and government processes that are hazard-related and have occurred since the last Strategy review;
 - Community change;
 - growth and development in vulnerable areas;
 - Impact of actions resulting from growth that adversely affect natural resources in vulnerable areas, such as sea walling, beach erosion, heightening deposition in inlets;
 - Demographic changes;
 - New hazards identified;
 - Changes in community economic structure; Special needs population changes;
 - Government process changes;
 - New or changing laws, policies, and regulations;
 - Changes in funding sources or requirements;
 - Change in priorities for implementation;
 - Changes in government structure;
 - Shifts in responsibility and mitigation committee resources; Progress in implementing LMS initiatives and projects - the Strategy initiatives and projects as compared with actual results at the date of the report;
 - Effectiveness of the implemented initiatives and projects;
 - Evaluation of unanticipated problems and opportunities that have occurred between the date of adoption and date of report;
 - Evaluation of hazard-related public policies, initiatives, and projects; and assess the effectiveness of public and private sector coordination and cooperation.
- Step 5 The LMS Coordinator determines best method to solicit public input. The LMS Coordinator is responsible for public noticing/advertising requirements. All Steering Committee members are informed and requested to attend public meeting.

- Step 6 A public meeting is held. The LMS Coordinator or a representative of the Steering Committee presents findings, conclusions, and recommendations of Strategy effort. Public comments are recorded.
- Step 7 The LMS Coordinator of the Division of Emergency Management distills and synthesizes public comments in memorandum.
- Step 8 The LMS Coordinator coordinates and organizes second meeting of Steering Committee. The draft Strategy update report is distributed to the Steering Committee seven days prior to the meeting. The Steering Committee meeting is held. Consensus is reached on changes to the draft. If certain local governments cannot reach agreement on certain issue(s) and/or project prioritization(s), the conflict resolution process (Section 6) may be triggered for those specific items parties cannot agree upon. A vote is taken securing approval of the draft Strategy Update Report, contingent upon integrating Steering Committee comments into draft report.
- Step 9 The LMS Coordinator incorporates modifications/additions resulting from Steering Committee meeting.
- Step 10 The LMS Coordinator finalizes the Strategy Update Report. Copies are distributed to Steering Committee members.
- Step 11 Each jurisdictional representative presents the updated Strategy to their respective governing body and other interested parties. If there are new or modified recommendations that their local government could implement to further the countywide Strategy, member seeks direction from governing body to implement appropriate strategies.
- Step 12 The final updated LMS is formally adopted by all of the participating jurisdictions.
- Step 13 The final updated LMS is forwarded on to the State Hazard Mitigation Officer at the Florida Division of Emergency Management.

St. Lucie County Local Mitigation Strategy Project Prioritization List March 10, 2016 Update SLC LMS Project List March 10 2016
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Project Id. Nr.	Project Description	Project Cost (\$)	Hazard Mitigated	Jurisdictions Benefitted	Potential Funding Source ¹	Timeframe to Complete Project	Implementation Responsibility	Project Status
10-1	Storm Hardning a FPUA Water Pumping Facility	300,000.00	Hurricanes/Tropical Storms	Fort Pierce St. Lucie County	Federal hazard mitigation grants	< 2 years	Ft. Pierce Utilities Authority	In Porogress
09-2	Mosquito Control Impoundment – Protect impoundment berms from erosion caused by storm surge by installing rip rap.	250,000.00	Erosion, epidemics	All	Mosquito Control District funds. State and federal hazard mitigation grants	< 2 years	St. Lucie County Mosquito Control District	Deferred. Awaiting funding.
09-1	Wind Retrofit Four County Buildings – Logistics Center, Heavy Equipment Storage Building, Ave. C Health Dept. & Airport Administration Building	250,000.00	Hurricane	St. Lucie County	St. Lucie County, State and federal hazard mitigation grants	< 2 years	St. Lucie County Central Services	Deferred. Awaiting funding.
09-4	Phase 1 STEP Tank Replacement – Replace 276 STEP systems for phase 1 in Section 30.	524,000.00	Flood	Port St. Lucie	Port St. Lucie, State and federal hazard mitigation grants	< 2 years	Port St. Lucie Utilities	Ongoing
09-6	Flood Proofing School District Administrative Office	2,600,000.00	Flood	All	Federal hazard mitigation grants	< 2 years	St. Lucie County School District	Deferred. Awaiting funding.
08-10	St. Lucie West Stormwater Improvements	195,000.00	Flood	Port St. Lucie	St. Lucie County, Section 319 grants. State and federal hazard mitigation grants.	< 2 years	St. Lucie West Service District	Deferred. Awaiting funding.
08-12	Provide wind storm mitigation for low income housing	1,000,000.00	Hurricane/ Tropical Storm, Tornado	All	State and federal hazard mitigation grants.	< 2 years	INTACT	Deferred. Awaiting funding.
08-5	Place a new roof on FPUA's Energy Service Center. The building serves as the EOC for FPUA.	500,000.00	Hurricane/ Tropical Storm, Tornado	Fort Pierce	Fort Pierce Utilities Authority. State and federal hazard mitigation grants.	< 6 months	Fort Pierce Utilities Authority	Deferred. Awaiting funding.
08-9	F1 - Install an electric motor on the "Gates Structure" on Canal 1 / Taylor Creek	250,000.00	Flood	St. Lucie County Fort Pierce	FPFWCD, State and federal hazard mitigation grants	< 6 months	Fort Pierce Farms Water Control District	Deferred. Awaiting funding.
08-8	Replace gate lifting shafts and repair the pump house and motors on the "Fittings Structure" on Ten Mile Creek.	225,000.00	Flood	St. Lucie County Fort Pierce Port St. Lucie	NSLRWCD, State and federal hazard mitigation grants.	< 6 months	North St. Lucie River Water Control District	Deferred. Awaiting funding. This project has been combined with project 07-13 and 07-45 in an effort to save money.
08-1	Replace sidelot pipes to reduce flooding.	1,200,000.00	Flood	Port St. Lucie	Port St. Lucie, State and federal hazard mitigation grants.	2-3 years	Port St. Lucie Public Works	Deferred. Awaiting funding.
07-1	Virginia Avenue Basin (Mayflower Canal & U.S. Highway 1 crossing) – Upgrade/replace culvert crossing of the Mayflower Canal and U.S. Highway 1 drainage.	750,000.00	Flood	Fort Pierce St. Lucie County	Fort Pierce, State and federal hazard mitigation grants.	< 2 years	Fort Pierce Public Works	Will advise

Project Id. Nr.	Project Description	Project Cost (\$)	Hazard Mitigated	Jurisdictions Benefitted	Potential Funding Source ¹	Timeframe to Complete Project	Implementation Responsibility	Project Status
07-2	St. Lucie Gardens Stormwater Improvements – Design, permitting, land acquisition, and construction of stormwater project. Multi-phased project.	3,900,000.00	Flood	St. Lucie County	St. Lucie County. Section 319 grants. SLRIT Grants. State and federal hazard mitigation grants.	< 4 years	St. Lucie County Public Works	Deferred. Awaiting funding.
07-7	N-6 (Header Canal – Pump Station No. 2) – Install automatic operation controls on Pump Station No. 2 at the south end of Header Canal.	75,000.00	Flood	St. Lucie County	NSLRWCD. State and federal hazard mitigation grants.	< 2 years	North St. Lucie River Water Control District	Deferred. Awaiting funding.
07-8	N-5 (Header Canal – Pump Station No. 1) – Install automatic operation controls on Pump Station No. 1 at the north end of Header Canal.	75,000.00	Flood	St. Lucie County	NSLRWCD. State and federal hazard mitigation grants.	< 2 years	North St. Lucie River Water Control District	Deferred. Awaiting funding.
07-10	St. Lucie Plaza Drainage Improvements - Design, permitting, land acquisition, and construction of stormwater project. Multi-phased project.	3,000,000.00	Flood	St. Lucie County	St. Lucie County. State and federal hazard mitigation grants.	< 4 years	St. Lucie County Public Works	Deferred. Awaiting funding.
07-11	Harmony Heights Drainage Improvements - Design, permitting, land acquisition, and construction of stormwater project. Multi-phased project.	3,000,000.00	Flood	St. Lucie County	St. Lucie County. Section 319. SLRIT Grant. State and federal hazard mitigation grants.	< 4 years	St. Lucie County Public Works	Phase 1- Complete. Subsequent phases deferred. Awaiting funding.
07-12	Sunland Gardens Drainage Improvements - Design, permitting, land acquisition, and construction of stormwater project. Multi-phased project.	4,250,000.00	Flood	St. Lucie County	St. Lucie County. Section 319. SLRIT Grant. State and federal hazard mitigation grants.	< 4 years	St. Lucie County Public Works	Deferred. Awaiting funding.
07-13	N-4 (Fitting Structure Gates) – Install automatic controls on the "Fitting Structures" gates.	225,000.00	Flood	St. Lucie County	NSLRWCD. State and federal hazard mitigation grants.	< 2 years	North St. Lucie River Water Control District	Deferred. Awaiting funding. This project has been combined with project 08-8 and 07-45 in an effort to save money.
07-15	Emergency Communication Vehicle – Purchase and equip an emergency communication vehicle in order to provide continual broadcast on television during an emergency event.	300,000.00	All	All	St. Lucie County. State and federal hazard mitigation grants.	< 2 years	St. Lucie County Media	Deferred. Awaiting funding.
07-17	N-3 (Gordy Road Structure Gates) – Install automatic controls on the "Gordy Road Structure" gates.	200,000.00	Flood	St. Lucie County Port St. Lucie	NSLRWCD. State and federal hazard mitigation grants.	< 6 months	North St. Lucie River Water Control District	Deferred. Awaiting funding.

TABLE 12-2016 Projects

Project Id. Nr.	Project Description	Project Cost (\$)	Hazard Mitigated	Jurisdictions Benefitted	Potential Funding Source ¹	Timeframe to Complete Project	Implementation Responsibility	Project Status
07-18	South 7 th Street Drainage Improvements - Design, permitting, land acquisition, and construction of stormwater project. Multi-phased project.	250,000.00	Flood	St. Lucie County	St. Lucie County. Section 319 grants. SLRIT Grants. State and federal hazard mitigation grants.	< 2 years	St. Lucie County Public Works	In progress. Under design
07-19	Carlton Road Drainage Improvements - Design, permitting, land acquisition, and construction of stormwater project. Multi-phased project.	550,000.00	Flood	St. Lucie County	St. Lucie County. Section 319 grants. SLRIT Grants. State and federal hazard mitigation grants.	< 4 years	St. Lucie County Public Works	Deferred. Awaiting funding. Will check
07-20	Paradise Park Drainage Improvements - Design, permitting, land acquisition, and construction of stormwater project. Multi-phased project.	3,000,000.00	Flood	St. Lucie County	St. Lucie County. Section 319 grants. SLRIT Grants. State and federal hazard mitigation grants.	< 4 years	St. Lucie County Public Works	This is a 5-phase project. Phase 1 is completed. Phase 2 is in progress. Phase 3 completed phase 4 ip
07-21	Silver Lake Park Drainage Improvements - Design, permitting, land acquisition, and construction of stormwater project. Multi-phased project.	1,000,000.00	Flood	St. Lucie County	St. Lucie County. Section 319 grants. SLRIT Grants. State and federal hazard mitigation grants.	< 2 years	St. Lucie County Public Works	Deferred. Awaiting funding.
07-22	Wilbure Subdivision Drainage Improvements - Design, permitting, land acquisition, and construction of stormwater project. Multi-phased project.	1,000,000.00	Flood	St. Lucie County	St. Lucie County. Section 319 grants. SLRIT Grants. State and federal hazard mitigation grants.	< 4 years	St. Lucie County Public Works	Deferred. Awaiting funding.
07-23	Bluefield Road Drainage Improvements - Design, permitting, land acquisition, and construction of stormwater project. Multi-phased project.	500,000.00	Flood	St. Lucie County	St. Lucie County. Section 319 grants. SLRIT Grants. State and federal hazard mitigation grants.	< 4 years	St. Lucie County Public Works	Multi-phased project. Phase 1 is completed. Phase 2 is deferred. Awaiting funding. Will check
07-24	White City/Citrus Avenue Drainage Study - Drainage improvements for a severely flood prone subdivision of fifty homesites, on septic tank and well system.	1,500,000.00	Flood	St. Lucie County	St. Lucie County. Section 319 grants. SLRIT Grants. State and federal hazard mitigation grants.	< 2 years	St. Lucie County Public Works	IP completing in 2016.
07-25	Trowbridge Road Drainage Improvements - Design, permitting, land acquisition, and construction of stormwater project. Multi-phased project.	1,000,000.00	Flood	St. Lucie County	St. Lucie County. Section 319 grants. SLRIT Grants. State and federal hazard mitigation grants.	< 4 years	St. Lucie County Public Works	Deferred. Awaiting funding. Checking
07-26	Westmoreland Blvd./Gatlin Culvert - Drainage improvements to a section of Westmoreland Blvd. that is subject to flooding during heavy rains	50,000.00	Flood	St. Lucie County	St. Lucie County. State and federal hazard mitigation grants	< 4 years	St. Lucie County Public Works	Deferred. Awaiting funding. checking

Project Id. Nr.	Project Description	Project Cost (\$)	Hazard Mitigated	Jurisdictions Benefitted	Potential Funding Source ¹	Timeframe to Complete Project	Implementation Responsibility	Project Status
07-27	Indian River Estates Drainage Improvements – Drainage improvements for a severely flood prone subdivision of 1,800 single family homesites, on septic tanks and wells.	4,800,000.00	Flood	St. Lucie County	St. Lucie County. State and federal hazard mitigation grants	4+ years	St. Lucie County Public Works	This is a 2-phased project. Phase 1- pump station & treatment pond- completed. Phase 2 icomplete 2015 phase 3 in design
07-28	Ten Mile Creek (Regional Attenuation Facility) – joint project between St. Lucie County, U.S. Army Corps of Engineers, and South Florida Water Management District to construct a regional storage reservoir for stormwater within a flood prone river flood plain area affecting approximately 50 homesites.	30,000,000.00	Flood	St. Lucie County Fort Pierce Port St. Lucie	Army Corps of Engineers	N/A	St. Lucie County	In progress
07-134	Access Route Clearing Equipment – Hitch and light trailer equipped with items including but not limited to: hand tools, chain saws, ropes and tackle, to enable trained personnel to readily clear routes to critical facilities and neighborhoods	10,000.00	Flood, Hurricanes / Tropical Storm, Tomadoes, Severe Thunderstorm& Lightning, Seismic Hazards, Technological, Societal	All	St. Lucie County Sheriff's Office, Homeland Security Grants, State and federal hazard mitigation grants.	6 months	St. Lucie County Sheriff's Office	Deferred. Awaiting funding.
07-37	F-2 (Canal No. 21 culvert replacement) – Replace the existing 36-inch diameter gated culvert connection between Canal No. 21 and C-25 of the South Florida Water Management District with a 72-inch diameter weir-control gate.	300,000.00	Flood	St. Lucie County Fort Pierce	FPFWCD. State and federal hazard mitigation grants.	< 2 years	Fort Pierce Farms Water Control District	Deferred. Awaiting funding. Checking
07-39	Airosa Culverts at Eyerly – Replacement of culverts at Airosa & Eyerly to a larger sized culvert due to severe flood after heavy rains	300,000.00	Flood	Port St. Lucie	Port St. Lucie. State and federal hazard mitigation grants.	< 2 years	Port St. Lucie Public Works	Deferred. Awaiting funding. checking
07-42	Comprehensive Drainage Plan – Identify the sub-basin, determine necessary improvements, and long-term maintenance of stormwater within the Village.	100,000.00	Flood	St. Lucie Village	St. Lucie Village. State and federal hazard mitigation grants.	< 1 year	St. Lucie Village	Deferred. Awaiting funding.
07-45	N-7 (Radial Gates) – Replace the radial gates on the "Fitting Structure" with stainless steel gates.	225,000.00	Flood	St. Lucie County	FPFWCD. State and federal hazard mitigation grants	< 2 years	North St. Lucie River Water Control District	Deferred. Awaiting funding. This project has been combined with project 08-8 and 07-13 in an effort to save money. Checking

March 10, 2018 Update

Project Id. Nr.	Project Description	Project Cost (\$)	Hazard Mitigated	Jurisdictions Benefitted	Potential Funding Source ¹	Timeframe to Complete Project	Implementation Responsibility	Project Status
07-48	Easy Street – Replacement of all cross pipes at Buchanan Dr., Pinetree Dr., Palmetto Dr., Silver Oak Dr., Seagrape Dr., Myrtle Dr., Birch Dr., Hickory Dr., Raintree Trail, Tangelo Dr., Spruce Dr., Cassia Dr., Bamboo Dr., Balsam Dr., Papaya Dr., and Yucca Dr.	150,000.00	Flood	St. Lucie County	St. Lucie County. State and federal hazard mitigation grants.	< 4 years	St. Lucie County Public Works	Phaes 3 of IRE 27, deferred phase 4
07-51	Road Restoration and Improvement - Initiation of a study to evaluate the condition of roads within the Village and then prioritize road restoration projects to ensure the most deteriorated facilities are brought into conformance.	Not Available	Floods. Hurricane / Tropical Storm, Technological	St. Lucie Village	St. Lucie Village	< 1 year	St. Lucie Village	Deferred. Awaiting funding.
07-55	Merritt Ditch & Sunrise Blvd. Crossing – Replacement of 60-inch pipe.	75,000.00	Flood	St. Lucie County	St. Lucie County. State and federal hazard mitigation grants.	18 months	St. Lucie County Public Works	Deferred. Awaiting funding. C checking
07-56	Merritt Ditch & Elm Street Crossing – Replacement of 60-inch pipe.	75,000.00	Flood	St. Lucie County	St. Lucie County. State and federal hazard mitigation grants.	18 months	St. Lucie County Public Works	Deferred. Awaiting funding.
07-58	Mariposa Ditch – Redesign and reroute of failing ditch.	750,000.00	Flood	St. Lucie County	St. Lucie County. State and federal hazard mitigation grants.	18 months	St. Lucie County Public Works	Deferred. Awaiting funding. checking
07-64	Municipal Water Service – Provide municipal water services to the residents of St. Lucie Village.	Not Available	Epidemic	St. Lucie Village	St. Lucie County. St. Lucie Village.	2 years	St. Lucie Village	Deferred. Awaiting funding.
07-68	National Register Properties Damage Assessment – Assess the exposure to damage by any type of disaster for properties located within the Village's Historic District.	Not Available	All	St. Lucie Village	St. Lucie Village	< 6 months	St. Lucie Village	Deferred. Awaiting funding.
07-69	Comprehensive Emergency Management Plan – Complete a study to determine the appropriate process to handle emergency management in the Village.	Not Available	All	St. Lucie Village	St. Lucie Village, DCA Grants.	1 year	St. Lucie Village	Deferred. Awaiting funding.
07-72	Right of Way Culvert Replacement Project – Replace drainage right-of-way culverts with corrugated metal pipes on failing cross roads.	2,800,000.00	Flood	Port St. Lucie	Port St. Lucie, State and federal hazard mitigation grants.	< 1 year	Port St. Lucie Public Works	In progress. Annual maintenance
07-73	Wildland Fire Mitigation Plan – Research and prepare a wildland fire mitigation plan.	Not Available	Wildland Fire	St. Lucie Village	St. Lucie Village, State and federal hazard mitigation grants.	< 1 year	St. Lucie Village	Deferred. Awaiting funding.

Project Id. Nr.	Project Description	Project Cost (\$)	Hazard Mitigated	Jurisdictions Benefitted	Potential Funding Source ¹	Timeframe to Complete Project	Implementation Responsibility	Project Status
07-74	Wildland Fire Mitigation Plan – City of Port St. Lucie – Preparation of a Wildland Fire Mitigation Plan as part of the Comprehensive Emergency Operations Plan.	100,000.00	Wildland Fire	Port St. Lucie	Port St. Lucie, State and federal hazard mitigation grants.	N/A	Port St. Lucie Emergency Management	Completed
07-75	Transfer of Public Records – Transfer of public records from paper to an optical disc.	40,000.00	Floods, Hurricanes / Tropical Storms, Tornadoes, Severe Thunderstorm & Lightning, Seismic, Technological, Societal	Fort Pierce	Fort Pierce, State and federal hazard mitigation grants.	1 – 2 years	Fort Pierce Public Works	In progress.
07-78	Pet/Small Animal Shelter – Design and construct a pet/small animal shelter.	1,500,000.00	Floods, Hurricanes / Tropical Storm, Severe Thunderstorm & Lightning, Wildland Fire, Extreme Temperature, Seismic, Epidemics, Technological, Societal	All	St. Lucie County, State and federal hazard mitigation grants.	2 years	St. Lucie County Central Services	Deferred. Awaiting funding.
07-79	Vital records protection facility.	600,000.00	Floods, Hurricanes / Tropical Storm, Severe Thunderstorm & Lightning, Wildland Fire, Extreme Temperature, Seismic, Epidemics, Technological, Societal	Port St. Lucie	Port St. Lucie, State and federal hazard mitigation grants.	2 years	Port St. Lucie Public Works	Deferred. Awaiting funding.
07-80	Rivergate (Erosion Control Devices) – Develop and install erosion control barriers along the entire shore of Rivergate Waterway.	Not Available	Flood, Erosion.	Port St. Lucie	Port St. Lucie	2 years	Port St. Lucie Public Works	Deferred. Awaiting funding.
07-81	Recreation Building Upgrades – Retrofit current buildings in parks to current codes (garages, doors).	25,000 per site	Hurricane / Tropical Storm, Tornadoes	Port St. Lucie	Port St. Lucie, State and federal hazard mitigation grants	< 1 year	Port St. Lucie Public Works	Deferred. Awaiting funding.
07-85	Community Rating System Designation – Apply and establish the Village as a participant of the Community Rating System for insurance reductions.	0.00	Flood	St. Lucie Village	St. Lucie Village, State and federal hazard mitigation grants.	< 1 year	St. Lucie Village	In progress
07-88	Horizontal Wells – Provide horizontal wells throughout the County in order to provide access to water during emergencies.	500,000.00	Wildland Fire, Drought	All	St. Lucie County, State and federal hazard mitigation grants	4 + years	St. Lucie County Fire District	Deferred. Awaiting funding. checking

Project Id. Nr.	Project Description	Project Cost (\$)	Hazard Mitigated	Jurisdictions Benefitted	Potential Funding Source ¹	Timeframe to Complete Project	Implementation Responsibility	Project Status
07-89	Acquire properties along the Indian River Lagoon, the St. Lucie River, Ten Mile Creek, Five Mile Creek, tributaries of these waters, the Atlantic Ocean and other flood plain areas to direct residential and commercial development away from coastal and flood plain and to restore the natural floodplain.	13,000,000.00	Flood	All	St. Lucie County, Florida Communities Trust Grants.	Ongoing	St. Lucie County Environmental Resources	In progress. Ongoing project.
07-90	Repetitive Loss Inventory Buyout – Acquire properties located on the repetitive loss inventory to eliminate future flooding of structure.	2,500,000.00	Flood	All	St. Lucie County, State and federal hazard mitigation grants	> 4 years	St. Lucie County Grants / Disaster Recovery	In progress. 7 properties are to be purchased in 2010. checking
07-91	Citrus Avenue Basin Retrofit – Construct a stormwater treatment facility for an 80-acre drainage basin.	1,500,000.00	Flood	Fort Pierce	Fort Pierce, Section 319, SLRIT Grant, State and federal hazard mitigation grants.	4+ years	Fort Pierce Public Works	Deferred. Awaiting funding.
07-94	Public Works Facility – Construct a new Public Works Facility adjacent to the Florida Turnpike.	3,500,000.00	Floods, Hurricanes / Tropical Storm, Severe Thunderstorm & Lightning, Wildland Fire, Extreme Temperature, Seismic, Epidemics, Technological, Societal	Port St. Lucie	Port St. Lucie, State and federal hazard mitigation grants.	< 4 years	Port St. Lucie Public Works	Deferred. Awaiting funding.
07-96	Watershed "A" – West E-84 Improvements – Improvements to the E5 and E-84 drainage canals and E-84 drainage basin to reduce flooding hazard	1,210,000.00	Flood	Port St. Lucie	Port St. Lucie, State and federal hazard mitigation grants.	18 months	Port St. Lucie Public Works	Deferred. Awaiting funding.
07-98	St. Lucie North – Construct improvements to the C-104, C-105, C-106, C-107, and C-108 drainage canals to reduce flooding hazards	1,200,000.00	Flood	Port St. Lucie	Port St. Lucie, State and federal hazard mitigation grants.	2 years	Port St. Lucie Public Works	Completed
07-99	Cameo Boulevard/Turtle Run Park Debris Storage Area – Develop/Identify an area for emergency management debris removal and storage, including construction of infrastructure to reach site and area for mass temporary housing.	500,000.00	Flood, Hurricane / Tropical Storm, Tornadoes	Port St. Lucie	Port St. Lucie, State and federal hazard mitigation grants.	< 2 years	Port St. Lucie Public Works	Deferred. Awaiting funding.
07-100	Collect data for infrastructure and critical facilities	Not Available	All	All	St. Lucie County	Ongoing	St. Lucie County Public Safety	In progress. Project is considered to be ongoing.
07-101	Collect data to improve future loss estimation efforts.	Not Available	All	All	St. Lucie County	Ongoing	St. Lucie County Public Safety	In progress. Project is considered to be ongoing.

Project Id. Nr.	Project Description	Project Cost (\$)	Hazard Mitigated	Jurisdictions Benefitted	Potential Funding Source ¹	Timeframe to Complete Project	Implementation Responsibility	Project Status
07-105	Identify areas that may require Flood Insurance Rate Map (FIRM) revisions or amendments due to mitigation or development.	Not Available	Flood	All	St. Lucie County	Ongoing	St. Lucie County Public Works	In progress. Project is considered to be ongoing.
07-107	Four-wheel drive Risk/Threat Assessment, Search and Rescue vehicles – Acquire 6 4-wheel drive vehicles for Police Department for risk/threat assessment, search and rescue and ability to deliver supplies and personnel to flooded or damaged areas.	184,200.00	Flood, Hurricane / Tropical Storm, Tornado	Fort Pierce	Fort Pierce, State and federal hazard mitigation grants.	< 2 years	Fort Pierce Police Department	Deferred. Awaiting funding.
07-111	Water Control Structure 53-4 Replacement and Canal Stabilization – Replace failed drainage connection to SPWMD C-25 Canal to enhance flood protection for the surrounding residential and agricultural area of roughly 4000 acres.	150,000.00	Flood	Fort Pierce, St. Lucie County	NSLRWCD, State and federal hazard mitigation grants.	1 year	North St. Lucie River Water Control District	Deferred. Awaiting funding.
07-112	Water Control Structure 33-2 Replacement and Canal Stabilization – Replace failed drainage connection to SPWMD C-25 Canal to enhance flood protection for the surrounding residential and agricultural area of roughly 4000 acres.	750,000.00	Flood	Fort Pierce St. Lucie County	NSLRWCD, State and federal hazard mitigation grants.	1 year	North St. Lucie River Water Control District	Deferred. Awaiting funding.
07-116	Reverse Osmosis Plant Shuttering	250,000.00	Hurricane / Tropical Storm, Tornadoes	Port St. Lucie	Port St. Lucie, State and federal hazard mitigation grants.	< 1 year	Port St. Lucie Utilities	Deferred. Awaiting funding
07-117	Shuttering of Utilities Administration Building	330,000.00	Hurricane / Tropical Storm, Tornadoes	Port St. Lucie	Port St. Lucie, State and federal hazard mitigation grants.	< 1 year	Port St. Lucie Utilities	Deferred. Awaiting funding. checking
07-118	Provide windstorm damage mitigation and hurricane preparedness educational programming to the community and also to deliver information/resources regarding building codes, wind-load design and wind resistant technology to the building/construction industry.	400,000.00	Hurricane / Tropical Storm, Tornadoes	All	State and federal hazard mitigation grants	Ongoing	St. Lucie County Cooperative Extension Service – University of Florida	In progress. Project is considered to be ongoing.
07-123	Enhancement of Sheriff's Office Emergency Operations Center – Including but not limited to: additional phone line/jacks, dedicated computer, wall mounted map, fans, secure satellite dishes, wall mounted television, ceiling mounted projector	17,000,000.00	All	All	St. Lucie County Sheriff's Office, Homeland Security Grants, State and federal hazard mitigation grants.	1 year	St. Lucie County Sheriff's Office	Deferred. Awaiting funding. checking

Project Id. Nr.	Project Description	Project Cost (\$)	Hazard Mitigated	Jurisdictions Benefitted	Potential Funding Source ¹	Timeframe to Complete Project	Implementation Responsibility	Project Status
07-124	Camp – The administration bldg. is used as a “camp” as defined by ICS. Includes but not limited to: connecting existing generator to lift station; installing stainless double sink and additional kitchen appliance circuits; etc.	99,030.00	All	All	St. Lucie County Sheriff's Office, Homeland Security Grants, State and federal hazard mitigation grants.	6 months	St. Lucie County Sheriff's Office	Deferred. Awaiting funding.
07-125	Epix Digital Imaging System – Portable digital X-ray system to safely explore interior of a suspicious package. Team serves 3 counties and 2 RDSTF regions.	23,000.00	Technological, Societal	All	St. Lucie County Sheriff's Office, Homeland Security Grants, State and federal hazard mitigation grants.	< 1 year	St. Lucie County Sheriff's Office	Deferred. Awaiting funding.
07-127	Roadside Message Board Systems – One vehicle capable of towing 4,000 pound trailer, 2 trailers equipped with solar energy powered electronic message boards that can be transported to incident scenes to provide curfew, evacuation or other important information.	70,000.00	All	All	St. Lucie County Sheriff's Office, Homeland Security Grants, State and federal hazard mitigation grants.	< 1 year	St. Lucie County Sheriff's Office	Received 2 message boards from FDOT. Deferred. Funding for two vehicle is still needed.
07-128	Six satellite phones to allow communications between key Sheriff's Office Emergency managers/commanders, when cellular and radio communications are overwhelmed during a disaster or major event	30,000.00	All	All	St. Lucie County Sheriff's Office, Homeland Security Grants, State and federal hazard mitigation grants.	6 months	St. Lucie County Sheriff's Office	Received 1 fixed and 2 mobile satellite phone. Deferred. Funding for the remaining equipment is still needed.
07-129	EOC Base Station – Need base station radio installed at EOC for Emergency Management use.	3,500.00	All	All	St. Lucie County Sheriff's Office, Homeland Security Grants, State and federal hazard mitigation grants.	6 months	St. Lucie County Sheriff's Office	Checking
07-130	Emergency Responders Assistance Equipment – Hitch, light trailer, equipment and supplies, including but not limited to: air compressor, nail gun, ladders, supply of tarps, etc. to mitigate further damage to the homes of first responders and 24/7 essential	7,000.00	All	All	St. Lucie County Sheriff's Office, Homeland Security Grants, State and federal hazard mitigation grants.	6 months	St. Lucie County Sheriff's Office	Deferred. Awaiting funding.
07-131	Electronic Security System – Install digital video security system where none currently exists and upgrade portal entry system to proximity card system that works in conjunction with video recording system, to be installed at Sheriff's Admin. Office	110,000.00	All	All	St. Lucie County Sheriff's Office, Homeland Security Grants, State and federal hazard mitigation grants.	6 months	St. Lucie County Sheriff's Office	Deferred. Awaiting funding.

Project Id. Nr.	Project Description	Project Cost (\$)	Hazard Mitigated	Jurisdictions Benefitted	Potential Funding Source ¹	Timeframe to Complete Project	Implementation Responsibility	Project Status
07-132	Bi-Directional Amplifiers – Due to heavy construction of school buildings, Sheriff and PSLPD officers cannot communicate effectively with cellular or 800 Mhz radios.	320,000.00	All	All	St. Lucie County Sheriff's Office, Homeland Security Grants, State and federal hazard mitigation grants.	6 months	St. Lucie County Sheriff's Office	In Progress. Partial funding has been received for this project.
07-134	Access Route Clearing Equipment – Hitch and light trailer equipped with items including but not limited to: hand tools, chain saws, ropes and tackle, to enable trained personnel to readily clear routes to critical facilities and neighborhoods.	10,000.00	Floods, Hurricanes / Tropical Storm, Severe Thunderstorm & Lightning, Wildland Fire, Extreme Temperature, Seismic, Epidemics, Technological, Societal	All	St. Lucie County Sheriff's Office, Homeland Security Grants, State and federal hazard mitigation grants.	6 months	St. Lucie County Sheriff's Office	Deferred. Awaiting funding.
07-135	Construct safe spaces at Central Services Building and Road and Bridge Department so that first responders will be safe during storm events	100,000.00	Hurricane / Tropical Storms, Tornadoes	St. Lucie County	N/A	N/A	St. Lucie County Central Services	Deferred. Awaiting funding.
07-136	Relocate the wastewater treatment plant located immediately adjacent to the Indian River Lagoon in Fort Pierce. Shoreline erosion, which was severely aggravated by two recent hurricanes, is jeopardizing the plant.	60,000,000.00	Hurricane / Tropical Storm, Tomado, Epidemics, Technological, Societal	All	St. Lucie County, EPA /DEP grants, Legislative Earmark, State and federal hazard mitigation grants.	> 3 years	Fort Pierce Utilities Authority	Deferred. Awaiting funding.
07-137	Remove Australian pine and other woody invasive and exotic plant species along Highway A1A on South Hutchinson Island and create a water barrier to prevent their regeneration to reduce downed power lines and impeding traffic on Highway A1A.	1,000,000.00	Flood, Hurricane / Tropical Storms, Tornadoes	St. Lucie County	St. Lucie County, State and federal hazard mitigation grants.	1 year	St. Lucie County Mosquito Control	About 50% of the project has been completed. Deferred. The remainder of the project is still awaiting funding.
07-148	Emergency Access Bridge Connection – Design and construct a bridge over Five Mile Creek to allow emergency services unimpeded access to entire campus without delays for the benefit of those who use the campus	1,000,000.00	Floods, Tornadoes, Seismic Technological, Societal	All	Indian River State College, State and federal hazard mitigation grants.	< 2 years	Indian River State College	Deferred. Awaiting funding checking
07-149	Marine Science Center Flood Protection – Waterproofing and stormwater removal measures to prevent flooding of college building on South Hutchinson Island	150,000.00	Flood	All	Indian River State College, State and federal hazard mitigation grants.	2+ years	Indian River State College	Deferred. Awaiting funding checking
07-150	Campus drainage infrastructure refurbishment and maintenance – cleaning and replacement of Main Campus drainage infrastructure to significantly lessen the potential for severe flooding	175,000.00	Flood	All	Indian River State College, State and federal hazard mitigation grants.	< 4 years	Indian River State College	Deferred. Awaiting funding checking

6.6.2.2 Methodology

Potential LMS mitigation projects and activities will be evaluated based on the following four criteria:

1. Which goal(s) the project addresses;
2. Which hazard(s) the project addresses;
3. Whether or not the project is supported in a plan or policy of the jurisdiction (i.e., Comprehensive Growth Management Plan, Comprehensive Emergency Management Plan, Stormwater Management Plan, etc.);
4. Population benefiting from the mitigation project;
5. Does the project address an immediate threat to public health, safety, and welfare; and
6. What is the project's benefit cost ratio?

In order to evaluate the projects, the Steering Committee must first establish the priority goals and hazards using the following methodology. The process listed below will be followed during each update of the LMS.

The Steering Committee members were provided a survey of all submitted projects. Each Stakeholder will complete a Project Scoring Sheet for each project. After scoring each project, a list of each stakeholder's projects will be prioritized. If any projects received the same ranking, the stakeholder will determine the final ranking order. A summary of those rankings were conducted and a final list was composed by stakeholder from those scores. A summary of the rankings were provided to all LMS Committee members and those rankings were submitted to the FDEM on January 30, 2015.

6.6.2.3 Prioritization Process

Please prioritize the following LMS goals using the following methodology. Rank the St. Lucie County LMS goals, by placing a 1, 2, 3, or 4 next to the goals according to the following priority ranking. Place a 1 next to the goal with the highest priority in the County. Place a 2 next to the goal with the second highest priority in the County. Place a 3 next to the goal with the third highest priority, etc.

Goal	Rank
Reduce the loss of life and property	
Achieve safe and fiscally sound, sustainable communities	
Facilitate orderly recovery and post-disaster redevelopment	
Optimize the effective use of all available resources	

Please prioritize the following hazards according to the likelihood of occurrence and exposure. Likelihood of occurrence means how often you would expect this hazard to impact the County. For each hazard, rank its likelihood of occurrence according to the following: 1 = not likely to occur, 3 = might occur, and 5 = very likely to occur. Exposure means the number of people and structures, and the value of structures that could be impacted by the hazard. Once you have scored each hazard's likelihood of occurrence and exposure, add the two scores together, and place the total in the "total score" column.

Hazards	Likelihood	Exposure	Total
Agricultural Pest and Disease			
Civil Disturbance			
Communication Failure			
Drought			
Epidemic			
Erosion			
Extreme Temperature			
Flooding			
Hazardous Materials Accident			
Hurricane/Tropical Storm			
Immigration Crisis			
Power Failure			
Radiological Hazards			
Seismic (Sinkholes, Earthquakes, Dam/Levee Failure)			
Terrorism/Sabotage			
Thunderstorm/Lightning			
Tornado			
Transportation System Accident			
Wellfield Contamination			
Wildland Fire			

6.6.2.4 Prioritization Scoring

The rankings above will be translated into scores so that priority can be determined. Once the Steering Committee has ranked the goals and hazards, staff will convert the rankings into numerical scores as follows:

Goals

Rank #1 - 4 points

Rank #2 - 3 points

Rank #3 - 2 points

Rank #4 - 1 points

The goal with the most points will be the highest priority goal, the goal with the second highest points will be the second highest priority goal, and the goal with the lowest score will be the third priority goal, etc.

Hazards will be prioritized according to the total score column of the prioritization sheet. All responses from the Steering Committee will be added together to get the overall scores. The hazards will be ranked according to the scores - the hazards receiving the highest scores will be ranked highest on the PPL.

6.6.2.5 Project Evaluation

The process above results in a prioritized list of goals and hazards; from here, the projects or mitigation activities can be evaluated and ranked based on the following criteria:

- Which goal(s) the project addresses;
- Which hazard(s) the project addresses;
- Whether or not the project is supported in a plan or policy of the jurisdiction (i.e., Comprehensive Growth Management Plan, CEMP, Stormwater Management Plan, etc.);
- Population benefiting from the mitigation project;
- Does the project address an immediate threat to public health, safety, and welfare; and
- What is the project's benefit cost ratio?

Any organization interested in submitting a project for the PPL must complete a project submission form. The form will include questions regarding the above criteria. Proposers will be asked to identify which goal(s) the project addresses, which hazard(s) the project addresses, cite supporting evidence from other plans, document the population affected, and document how the project addresses the issues of public health, safety, and welfare (PHSW). Emergency Management Agency staff will review the criteria listed above to projects that are up for consideration for the LMS PPL. Each project will be scored by each submitting stakeholder according to the point system below. Each stakeholders' projects will be listed on the PPL ranked according to their total evaluation score. Each stakeholders' project with the most points will be ranked first.

The Steering Committee prioritized the plan goals as follows:

- Reduce the loss of life and property.
- To optimize the effectiveness use of all available resources.
- To achieve safe and fiscally sound, sustainable communities.
- To ensure orderly, effective short-term recovery and redevelopment.

The Steering Committee prioritized the hazards as follows:

1. Flood
2. Hurricane/Tropical Storm
3. Thunderstorm/Lightning
4. Power Outage
5. Wildland Fire
6. Tornado
7. Wellfield Contamination
8. Transportation System Accident
9. Communication Failure
10. Radiological Accidents
11. Hazardous Materials Accident
12. Agricultural Pest and Disease
13. Erosion
14. Drought
15. Epidemic
16. Seismic
17. Terrorism/Sabotage
18. Extreme Temperature
19. Immigration Crisis
20. Civil Disturbance

Bulleted hazards indicate that no priority score was given; therefore, the hazard is a "non-immediate priority" hazard.

The maximum score for a project is 55 points, which would be received by a project that addresses multiple goals and hazards; is supported by multiple plans and policies; benefits the jurisdiction's entire population; addresses issues related to PHSW; and has a benefit cost ratio greater than 2.

The scores for the six criteria will be added together. The total scores for each of the six criteria will be the bases of the ranked list of projects. The projects with the highest score will be ranked highest on the PPL.

After the total scores have been determined, a revised PPL by stakeholder will be developed by listing the projects in ranked order according to score. Once a revised PPL has been developed, the Steering Committee will meet to discuss the new list. Any concerns regarding project scoring also will be addressed during this time. It is important to have the project decisions set before the disaster, so that when it does occur, the County or municipality can act quickly to implement mitigation.

6.6.2.6 Declared Emergency Assessment

- Step 1 Within 6-months following a Disaster Declaration, the Public Safety Director will initiate a post- disaster review and assessment. The Public Safety Director will activate the assessment by appointing a Strategy Update Subcommittee. Each member of the Strategy Update Subcommittee will be notified that the assessment process is being commenced.
- Step 2 The Public Safety Director, through the Strategy Update Subcommittee, will draft a Technical Report. The purpose of the report is to document the facts of the event and assess whether the Strategy effectively addressed the hazard. The Report should contain, at a minimum, the following:
- Identification of whether the hazard creating the declared emergency has been addressed in the Strategy;
 - Documentation of the event: the magnitude of the event, areal extent of damages, and specific damages sustained (public infrastructure [e.g., potable water and wastewater treatment plants and collection systems] and private infrastructure [e.g., utilities, power]);
 - Discussion of impacts to the private sector, such as obstacles to recovery, utilization of local vendors, deficits in types of products needed, accessibility of vendor suppliers, demand for space for temporary relocation, local business contingency plans, etc.;
 - Analysis of effectiveness of coordination among institutional entities (e.g., local governments, Florida Power & Light Company, AT&T, Red Cross, Salvation Army, South Florida Water Management District, FDEM, Florida Department of Transportation, ARC of St. Lucie County), and make recommendations, as necessary;
 - Evaluation of the accuracy of the hazard vulnerability and risk assessment in Strategy relative to actual event;
 - Identification of Strategy initiatives/projects that had been implemented to mitigate impacts of the type of flooding hazard creating the emergency event, and evaluate effectiveness.

- Discussion of unanticipated impacts, and identification of potential mitigation measures; and
 - Synthesis of information and prepare conclusions.
 - Review PPL top projects for each Stakeholder to ensure eligibility.
- Step 3 The LMS Coordinator of the Division of Emergency Management schedules a meeting of the Steering Committee and distributes copies of the draft Technical Report prior to the meeting.
- Step 4 A meeting of the Steering Committee is held. Members discuss the Report findings, conclusions, and recommendations, and determine whether the Strategy needs to be modified.
- Step 5 If the conclusion is that no modification is needed for the Strategy, the Report is approved and transmitted to local governments.
- Step 6 If it is determined that the Strategy is to be amended, the Steering Committee prepares draft Amended Strategy. The Amended Strategy should do the following:
- Utilize information from the Technical Report;
 - Provide justification of the need to amend the Strategy;
 - Contain a review and analysis of existing Strategy Initiatives/Projects in light of new Initiatives/Projects recommended in Technical Report; and
 - Include a re-prioritization of Initiatives/Projects.
- Step 7 A draft Amended Strategy is provided to each member of the Steering Committee 1 week in advance of the scheduled meeting.
- Step 8 A meeting of Steering Committee is held. The draft Amended Strategy is discussed. Modifications are suggested.
- Step 9 The LMS Coordinator of the Division of Emergency Management, in consultation with the Steering Committee, establishes appropriate method(s) to solicit public input. The LMS Coordinator is responsible for public noticing/advertising requirements. Steering Committee members are informed and requested to attend the public meeting.
- Step 10 The public meeting is held. The LMS Coordinator of the Division of Emergency Management or a representative of the Steering Committee presents findings, conclusions, and recommendations of draft Amended Strategy.
- Step 11 The LMS Coordinator distills and synthesizes public comments, and circulates them among the Steering Committee for comment. If comments are extensive and/or controversial, a meeting of the Steering Committee is scheduled and organized by the LMS Coordinator of the Division of Emergency Management. If no meeting of the Steering Committee is warranted, skip to STEP 13.
- Step 12 A meeting of the Steering Committee is held. Public comments are discussed. Consensus is reached as to how comments are to be reflected in the Amended Strategy. If agreement cannot be reached by certain local governments on certain issue(s) and/or project prioritization(s),

the conflict resolution process may be triggered for those specific items parties cannot agree upon. A vote is taken securing approval of the draft Amended Strategy Report, contingent upon integrating Steering Committee comments into draft report.

- Step 13 The LMS Coordinator modifies the draft report based on the outcome of the results of Steering Committee meetings (STEPS 8 & 12), or makes modifications resulting from public comments generated during STEP 10.
- Step 14 The LMS Coordinator finalizes the Amended Strategy. Copies of the Amended Strategy are distributed to the Steering Committee for review.
- Step 15 Each jurisdictional representative presents the Amended Strategy to their local governing body and other interested parties. If there are new or modified recommendations that their local government could implement to further the countywide Strategy, member seeks direction from governing body to implement appropriate strategies.
- Step 16 The final updated LMS is formally adopted by all participating jurisdictions.
- Step 17 The final updated LMS is forwarded to the State Hazard Mitigation Officer at the Florida Division of Emergency Management.

6.7 CONTINUING PUBLIC INVOLVEMENT

The St. Lucie County LMS Steering Committee recognizes the importance of public involvement in the LMS planning process. The Committee is committed to providing opportunities for the public to become and engaged in the LMS process. The Committee will ensure continued public involvement through the following methods:

- Advertising quarterly meetings of the LMS Steering Committee in local newspapers via press release and posting meeting dates to County website and calendar to ensure opportunities for the public to attend;
- Post updated LMS information and data on County and municipal websites when available;
- Engaging in public hazard awareness events and programs to make residents more aware of the hazards that St. Lucie County faces; and
- Providing copies of the final LMS at local library branches, city halls, and County Administrator and Mayoral offices for the public to view.

The LMS Coordinator shall have the responsibility of ensuring that these activities are being implemented.

6.8 CONFLICT RESOLUTION

6.8.1 Background

With multiple local governments involved in the development of the St. Lucie County LMS, differences of opinions may arise over the course of the program with regard to goals, objectives, policies, and projects. Governments often have different interests, priorities, and needs as well as distinct constituents.

In cases where an impasse occurs, there needs to be a procedure that can be activated to resolve such conflicts. This section describes the procedure that will be used to resolve conflicts arising among the participating entities in the development of the St. Lucie County LMS. The Conflict Resolution Process is depicted in Figure 6.3. The specific steps are described in detail below.

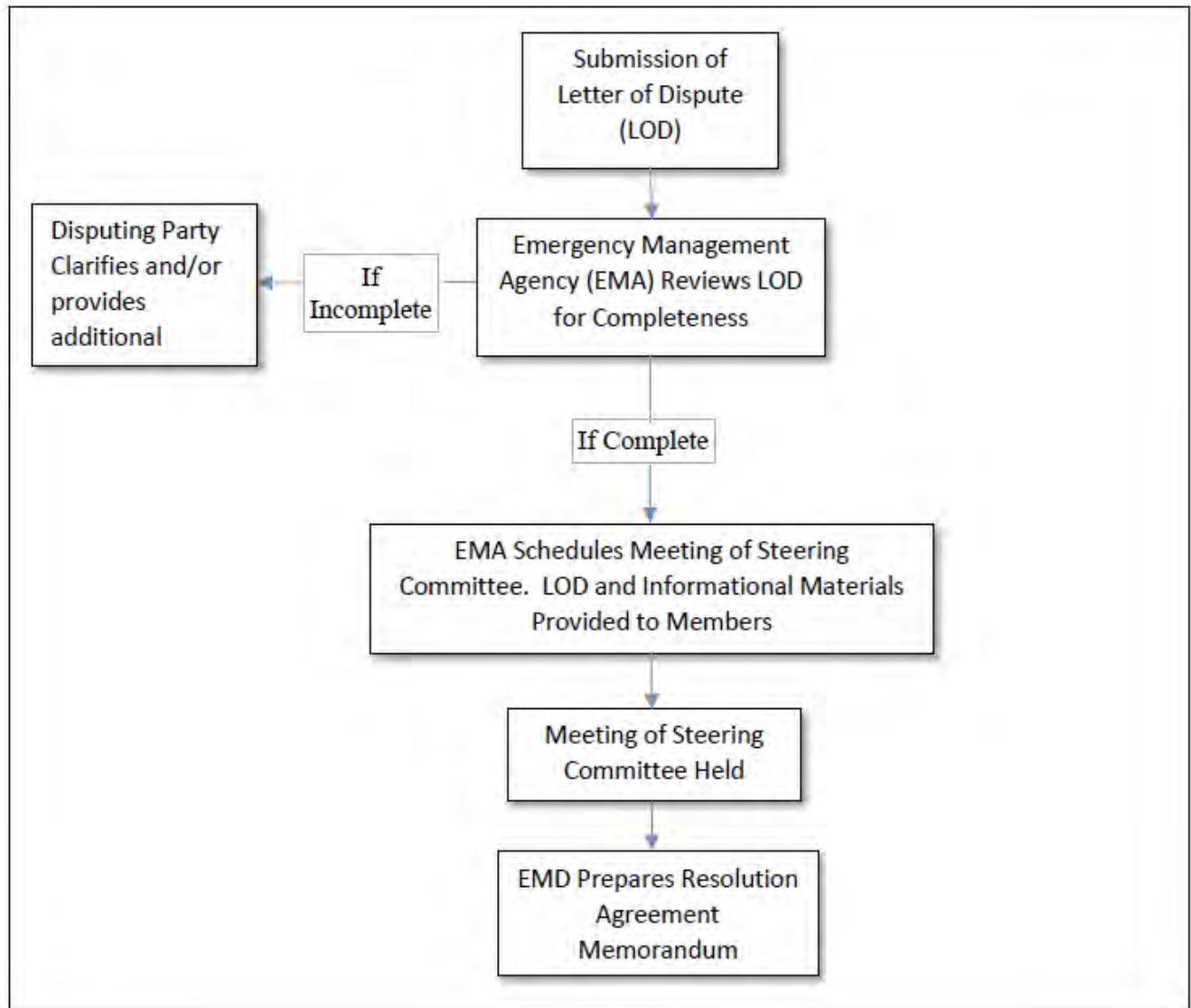
Prior to developing the process, other dispute resolution processes were investigated. They included the Treasure Coast Regional Planning Council (TCRPC) Dispute Resolution Process, the Palm Beach County Multi-jurisdictional Issues Coordination Forum, the South Florida Growth Management Conflict Resolution Consortium, the Volusia County Coastal Management Element Conflict Resolution Program, and the Monroe County procedures for resolving disputes during the planning, design, construction, and operation of wastewater collection/treatment and effluent disposal facilities.

The two types of conflicts that may arise are issues and disputes. Issues are technical problems that are susceptible to informal solution by emergency management or planning office staff. Disputes are problems that escalate to levels requiring formal resolution by neutral third parties. In either case, resolution or settlement will not be binding, but a mutual, agreed to understanding among the disputing parties.

Developing an LMS is a cooperative, collaborative process, and local governments should be able to reach consensus on most issues and problems that arise during the development period. When occasions arise where local governments cannot reach agreement on a particular issue or project, they will be able to petition a hearing of the issues before the Steering Committee.

Section 6.8.2 provides a detailed, step-by-step procedure that would be followed should a dispute arise during the study. The LMS Coordinator will serve as staff support to the Steering Committee.

Figure 6.3 - St. Lucie County Conflict Resolution Process



6.8.2 Conflict Resolution Procedure

Objective: To institute a fair, effective, and efficient process to resolve conflicts among local governments during the development of the single, countywide LMS.

During the development of the LMS, local governments may reach an impasse on a particular issue or position. The local government has an opportunity to elect to exercise the following LMS Conflict Resolution Process.

- Step 1 The local government would submit a Letter of Dispute (LOD) to the LMS Coordinator explaining in as much detail as possible, their concern and position along with documentation to support their position. In addition, they would outline potential alternative solutions.
- Step 2 The LMS Coordinator would review the LOD making sure that it clearly outlined the position of the local government(s) and provided sufficient information supporting their position so the dispute at question could be easily understood by the members of the Steering Committee. If necessary, the LMS Coordinator would contact the disputing party and ask for additional information/data necessary to clarify the position.
- Step 3 The LMS Coordinator will schedule a meeting of the LMS Steering Committee. In an effort to continue to try to resolve the impasse expeditiously, the LMS Coordinator will make every attempt to schedule the meeting within two calendar weeks from the date once the LMS Coordinator determines that there is sufficient information available to proceed to the Steering Committee. Each member will be sent a copy of the LOD and any supportive materials provided by the disputing party. The disputing party will be notified of the meeting date and time.
- Step 4 A meeting of the Steering Committee will be held. The representative of the disputing party will present their positions to the Steering Committee. Based on the ensuing discussion, hopefully resolution will be achieved. At the end of the meeting, if no mutually acceptable compromise is achieved, the position of the Steering Committee will be final. Whatever the outcome of the meeting, a memorandum of understanding will be prepared by the LMS Coordinator. To be official, the memorandum must have the concurrence of the Steering Committee Chair and a representative of the disputing party.

6.9 FUNDING

Whether projects are implemented in many instances is dependent on whether or not funding is available, match requirements are met or whether grant applications were awarded. Programs are dynamic (funded some years, cutback other years, or completely eliminated). The County and its municipalities maintain contact with their FDEM liaison and the FDEM Hazard Mitigation Grant Program Coordinator and the Treasure Coast Regional Planning Council (TCRPC) for available grants opportunities. In addition, the Region IV FEMA - PDM Senior Coordinator for Florida is an excellent resource as well.

Appendix A

Acronyms

ASFPM	Association of State Floodplain Managers
BFE	Base Flood Elevation
BOAF	Building Officials Association of Florida
CBRA	Coastal Barrier Resources Act
CDBG	Community Development Block Grant
CEMP	Comprehensive Emergency Management Plan
CERP	Comprehensive Everglades Restoration Plan
CGMP	Comprehensive Growth Management Plan
CHHA	Coastal High Hazard Area
CIE	Capital Improvements Element
CNMI	Commonwealth of North Mariana Islands
COOP	Continuity of Operations Plan
CRS	Community Rating System
FDEM	Florida Division of Emergency Management
DEP	Department of Environmental Protection
DMA2K	Disaster Mitigation Act of 2000
DOC	Department of Commerce
DOH	Department of Health in St. Lucie County
DOI	Department of the Interior
DRI	Disaster Recovery Initiative
EDA	Economic Development Administration
EHS	Extremely Hazardous Substance
EMPA	Emergency Management and Preparedness Assistance
EOC	Emergency Operations Center
EPA	Environmental Protection Agency
EPCRA	Emergency Preparedness and Community Right to Know Act
EPZ	Emergency Planning Zone
EQIP	Environmental Quality Incentives Program
ESF	Emergency Support Function
ESG	Emergency Shelter Grant
F.A.C.	Florida Administrative Code
FCMP	Florida Coastal Management Program
FCP	Flood Control Project
FCT	Florida Communities Trust
FDBPR	Florida Department of Business and Professional Regulation
FDEP	Florida Department of Environmental Protection
FDEM	Florida Division of Emergency Management
FDOC	Florida Department of Corrections
FDOE	Florida Department of Education
FDOF	Florida Division of Forestry
FDOI	Florida Department of Insurance
FDOMS	Florida Department of Management Services
FDOS	Florida Department of State
FDOT	Florida Department of Transportation

FEC	Florida East Coast Railroad
FEMA	Federal Emergency Management Agency
FIND	Florida Inland Navigation District
FIRM	Flood Insurance Rate Map
FMA	Flood Mitigation Assistance
FPL	Florida Power & Light
FRD	Fire Rescue District
F.S.	Florida Statutes
FSA	Farm Service Agency
HI	Heat Index
HMEP	Hazardous Materials Emergency Preparedness
HUD	United States Department of Housing and Urban Development
IBHS	Institute of Business and Home Safety
LAN	Large Area Network
LDR	Land Development Regulation
LEPC	Local Emergency Planning Committee
LMS	Local Mitigation Strategy
LOD	Letter of Dispute
MOM	Maximum of Maximums
MPO	Metropolitan Planning Organization
MUO	Multi-use Overlay
NASA	National Aeronautics and Space Administration
NCDC	National Climatic Data Center
NEHRP	National Earthquake Hazard Reduction Program
NFIP	National Flood Insurance Program
NFIRA	National Flood Insurance Reform Act
NFPA	National Fire Protection Administration
NGVD	National Geodetic Vertical Datum
NLSI	National Lightning Safety Institute
NOAA	National Oceanic and Atmospheric Administration
NRCS	National Resource Conservation Service
NRT	National Response Team
NWS	National Weather Service
PA	Public Assistance
PAGs	Protective Action Guidelines
PCCIP	President's Commission on Critical Infrastructure Protection
PDM	Pre-Disaster Mitigation
PDR	Purchase of Development Rights
PHSW	Public Health, Safety, and Welfare
PPL	Project Prioritization List
PUD	Planned Unit Development
PWIP	Public Works Impact Program
RC	Red Cross
RC& D	Resource Conservation and Development
RRT	Regional Response Team
RUS	Rural Utilities Service
SBA	Small Business Administration
SCORP	Statewide Comprehensive Outdoor Recreation Plan

SERC	State Emergency Response Commission
SFWMD	South Florida Water Management District
SHIP	State Housing Initiative Partnership
SLOSH	Sea Land Overland Surges for Hurricanes
STP	Surface Transportation Program
SWO	State Watch Office
TAOS	The Arbiter of Storms
TCRPC	Treasure Coast Regional Planning Council
TDR	Transfer of Development Rights
TIP	Transportation Improvement Plan
TYLCV	Tomato Yellow Leaf Curl Virus
USACOE	United States Army Corp of Engineers
USC	United States Code
USD	Urban Service District
USCG	United States Coast Guard
USDA	United States Department of Agriculture
USDOI	United States Department of the Interior
USFA	United States Fire Administration
USFS	United States Forest Service
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
VHF	Very High Frequency
WHIP	Wildlife Habitat Incentives Program

DEFINITIONS

Base Flood: A term used in the National Flood Insurance Program to indicate the minimum size flood to be used by a community as a basis for its floodplain management regulations; presently required by regulation to be that flood which has a one-percent chance of being equaled or exceeded in any given year. Also known as a 100-year flood or one-percent chance flood.

Base Flood Elevation: The elevation for which there is a one-percent change in any given year that flood levels will equal or exceed it. The BFE is determined by statistical analysis for each local area and designated on the Flood Insurance Rate Map. It is also known as the *100-Year Flood*.

Building Code: The regulations adopted by a local governing body setting forth standards for the construction, addition, modification, and repair of buildings and other structures for the purpose of protecting the health, safety, and general welfare of the public.

Coastal High Hazard Area: An area of special flood hazard, extending from offshore to the inland limit of a primary frontal dune, along an open coast and any other area subject to high velocity wave action from storms or seismic sources.

Continuity of Operations Plan (COOP): Continuity of Operations, as defined in the National Security Presidential Directive-51/Homeland Security Presidential Directive-20 (NSPD-51/HSPD-20) and the National Continuity Policy Implementation Plan (NCP/IP), is an effort within individual executive departments and agencies to ensure that Primary Mission Essential Functions (PMEFs) continue to be performed during a wide range of emergencies, including localized acts of nature, accidents and technological or attack-related emergencies.

Community Rating System (CRS): Recognizes and encourages community floodplain management activities that exceed the minimum NFIP standards. Depending upon the level of participation, flood insurance premium rates for policyholders can be reduced up to 45%. Implementing some CRS activities can help projects qualify for certain other federal assistance.

Critical Facilities: Those facilities essential to the health, safety and welfare of the population whose statutory purpose is to provide physical and mental health care and services. The services are necessary in the event of local, state and federal emergencies; and/or natural disasters; and, in time of evacuation, examples are: primary care centers; trauma units; emergency units; hospitals; infirmaries; mental health facilities and nursing homes.

Damage Assessment: The process utilized to determine the magnitude of damage and the unmet needs of individuals, businesses, the public sector, and the community caused by a disaster or emergency event.

Elevation: The raising of a structure to place it above flood waters on an extended support structure.

Eligible Community: A community for which the Administrator has authorized the sale of flood insurance under the National Flood Insurance Program.

Emergency: Absent a Presidential declared emergency, any incident(s), human-caused or natural, that requires responsive action to protect life or property. Under the Robert T. Stafford Disaster Relief and Emergency Assistance Act, an emergency means any occasion or instance for which, in the determination of the President, Federal assistance is needed to supplement State and local efforts and capabilities to save lives and to protect property and public health and safety, or to lessen or avert the threat of a catastrophe in any part of the United States.

Emergency Operations Center: The protected site from which civil government officials (municipal, County, State, and Federal) exercise **(EOC)** centralized direction and control in an emergency. Operating from an EOC is a basic emergency management concept.

For effective emergency response, all activities must be centrally directed and coordinated. The EOC also services as a Resource Center and coordination point for additional field assistance. It provides executive directives and liaison to State and Federal governments, and considers and mandates protective actions.

Emergency Planning & Community Right-To-Know Act: Legislation requiring that chemical information be made available to the community and the public.

Executive Orders 11988 and 11990: The requirements to avoid direct or indirect support of support of floodplain development and to minimize harm to floodplains and wetlands. Federal decision makers are obligated to comply with these orders, accomplished through an eight-step decision making process.

Executive Order 12699: Requires that new construction of Federal buildings must comply with appropriate seismic design and construction standards.

Exercise: Maneuver or simulated emergency condition involving planning, preparation, and Execution; carried out for the purpose of testing, evaluating, planning, developing, training, and/or demonstrating emergency management systems and individual components and capabilities, to identify areas of strength and weakness for improvement of an emergency operations plan (EOP).

Existing Construction: As used in reference to the National Flood/Insurance Program, any structure already existing or on which construction or substantial improvement was started prior to the effective date of a community's floodplain management regulations.

Facility: Any publicly or privately owned building, works, system or equipment, built or manufactured, or an improved and maintained natural feature. Land use for agricultural purposes is not a facility. This includes any publicly owned flood control, navigation, irrigation, reclamation, public power, sewage treatment and collection, water supply and distribution, watershed development, or airport facility; and non-Federal-aid street, road, or highway; and any other public building, structure including those used for educational, recreational, or cultural purposes, or any park.

Federal Emergency Management Agency: This agency was created in 1979 to provide a single point of single point of accountability for all Federal activities related to disaster mitigation and emergency preparedness, response, and recovery.

Federal Hazard Mitigation Officer: The FEMA employee responsible for representing the agency for each declaration in carrying out the overall responsibilities for hazard mitigation and for Subpart M, including coordinating post-disaster hazard mitigation actions with other agencies of government at all levels.

Federal Insurance Administration: The government unit, a part of FEMA, that administers the National Flood Insurance Program.

Flood Elevation Determination: A determination by the administrator of the water surface elevations of the base flood, that is, the flood level that has a one percent or greater change or occurrence in any given year.

Flood Hazard Boundary Map: The official map of a community that shows the boundaries of the floodplain and special flood hazard areas that have been designated. It is prepared by FEMA, using the best flood data available at the time a community enters the emergency phase of the NFIP. It is superseded by the FIRM after a more detailed study has been completed.

Flood Insurance: The insurance coverage provided under the National Flood Insurance Program.

Flood Insurance Rate Zone (FIRM): A zone identified on a Flood Insurance Rate Map (FIRM) as subject to a specified degree of flood, mudslide (mudflow), or flood-related erosion hazards, to which a particular set of actuarial rates and floodplain management requirements applies.

Flood Insurance Study: A study, funded by FEMA, FIA, and carried out by any of variety of agencies and consultants to delineate the special flood hazard areas, base flood elevations, and NFIP actuarial insurance rate zones. The study is based on detailed site surveys and analysis of site-specific hydrologic characteristics.

Flood Roofing: Any combination of structural and nonstructural additions, changes, or adjustments to properties and structures that reduce or eliminate flood damage to lands, water, and sanitary facilities, structures, and contents of buildings.

Florida Department of Emergency Management (FDEM): Has the lead role in coordinating State resources to support local government unless the scope of the emergency warrants a higher degree of State involvement. This may occur when emergencies involve multi-jurisdictional hazards, when local governments believe the emergency is beyond the capabilities of local resources, or when the Governor determines there is an overriding concern for the safety of the public. For these situations, the Governor can designate the primary responsibility for emergency response to the state by issuing an Executive Order under the provisions of Section 252.36, Florida Statutes assistance programs.

Florida Department of Economic Opportunity (FDEO): The State's land planning agency. It is comprised of a number of divisions, including the Bureau of Community Planning and Development. The DEO is responsible for reviewing and approving counties' Comprehensive Growth Management Plans. Additionally, if questions are posed over Land Development Regulations, the DEO will review the item to determine the appropriate application of the regulation.

Disaster Mitigation Act of 2000 (DMA2K): Public Law 106-390 provides the legal basis for FEMA mitigation planning requirements for State, local and Indian Tribal governments as a condition of mitigation grant assistance. It requires a State mitigation plan is continued as a condition of disaster assistance, adding incentives for increased coordination and integration of mitigation activities at the State level through the establishment of requirements for two different levels of state plans. DMA 2000 also established a new requirement for local mitigation plans and authorized up to 7 percent of HMGP funds available to a State for development of State, local, and Indian Tribal mitigation plans.

Department of Commerce: The mission of the Department is to create the conditions for economic growth and opportunity.

Department of Health -St. Lucie County: St. Lucie County Health Department is part of the Region Five Domestic Security Task Force. In cooperation with law enforcement and fire service partners, it addresses hazardous events which may impact the county.

Disaster Recovery Initiative (DRI): Provides assistance to households following a natural disaster as declared by the President of the United States or Governor of the State of Florida. DRI funds may be used for items such as, but not limited to, purchase of emergency supplies, weatherproofing damaged homes, interim repairs, insurance deductible payment, security deposit, rental assistance, and other activities approved by Florida Housing Financial Corporation.

Division of Emergency Management (DEM): The St. Lucie County Division of Emergency Management has the responsibility for the planning, training and exercising of all government and non-government agencies integral to a coordinated response to all disasters.

Emergency Management and Preparedness Assistance (EMPA): Emergency Management Competitive Grant Program offered by the Florida Division of Emergency Management that provides base Funding for County Emergency Management divisions, departments or agencies.

Emergency Operations Center (EOC): A central command and control facility responsible for carrying out the principles of emergency management, or disaster management functions during an emergency, and ensuring the continuity of operation of a company, political subdivision or other organization.

Economic Development Administration (EDA): Plays a critical role in fostering regional economic development efforts in communities across the nation. Through strategic investments that foster job creation and attract private investment, EDA supports development in economically distressed areas of the United States.

Extremely Hazardous Substance (EHS): Refers to substances identified by the US Environmental Protection Agency as extremely dangerous to human, animal, aquatic populations and the environment.

Hazard Mitigation Assistance Program: Provides a limited amount of funding to States to cover or to assist in covering the cost of preparing a pre-disaster hazard mitigation plan, one or more components of such a plan, or a related activity that will contribute to reducing vulnerability to hazards either throughout the State or for a selected area within the State.

Hazard Mitigation Grant Program: Authorized under Section 404 of the Stafford Act for hazard provides funding mitigation projects that are cost effective and complement existing post-disaster mitigation programs and activities by providing funding for beneficial mitigation measures that are not funded through other programs.

Hazard Mitigation Plan: The plan resulting from a systematic evaluation of the nature the nature and extent of vulnerability to the effects of natural hazards present in society that includes the actions needed to minimize future vulnerability to hazards.

HazMat: Hazardous Materials: any substance or material in a particular form or quantity that the Secretary of Transportation finds may pose an unreasonable risk to health, safety, and property, or any substance or material in a quantity or form that may be harmful to humans, animals, crops, water systems, or other elements of the environment if accidentally released. Substances so designated may include explosives, solids, combustible solids, poisons, oxidizing for corrosive materials, and flammable gases. Defined via rule making process, under authority of PL 93-633.

Hazards Analysis: The procedure for identifying potential sources of a hazardous materials release, determining the vulnerability of an area to a hazardous materials release, and comparing hazards to determine risks to a community.

Incident Command System (ICS): A standardized on-scene emergency management construct specifically designed to provide for the adoption of an integrated organizational structure that reflects the complexity and demands of single or multiple incidents, without being hindered by jurisdictional boundaries. ICS is the combination of facilities, equipment, personnel, procedures, and communications operating within a common organizational structure, designed to aid in the management of resources during incidents. It is used for all kinds of emergencies and is applicable to small as well as large and complex incidents. ICS is used by various jurisdictions and functional agencies, both public and private, to organize field-level incident management operations.

Individual Assistance: Supplementary Federal Assistance provided under the Stafford Act to individuals and families adversely affected by a major disaster or an emergency. Such assistance may be provided directly by the Federal Government or through State or local governments of disaster relief organizations.

Local Hazard Mitigation Officer: The representative of local government who serves on the Hazard Mitigation Survey Team or the Interagency Hazard Mitigation Team and who is the primary point of contact with FEMA, other federal agencies, and the State in the planning and implementation of post disaster hazard mitigation activities.

Major Disaster: As defined under the Robert T. Stafford Disaster Relief and Emergency Assistance Act (42 U.S.C. 5122), a major disaster is any natural catastrophe (including any hurricane, tornado, storm, high water, wind-driven water, tidal wave, tsunami, earthquake, volcanic eruption, landslide, mudslide, snowstorm, or drought), or, regardless of cause, any fire, flood, or explosion, in any part of the United States, which in the determination of the President causes damage of sufficient severity and magnitude to warrant major disaster assistance under this Act to supplement the efforts and available resources of States, tribes, local governments, and disaster relief organizations in alleviating the damage, loss, hardship, or suffering caused thereby.

Mitigation: The activities designed to reduce or eliminate risks to persons or property or to lessen the actual or potential effects or consequences of an incident. Mitigation measures may be implemented prior to, during, or after an incident. Mitigation measures are often informed by lessons learned from prior incidents. Mitigation involves ongoing actions to reduce exposure to, probability of, or potential loss from hazards. Measures may include zoning and building codes, floodplain buyouts, and analysis of hazard-related data to determine where it is safe to build or locate temporary facilities. Mitigation can include efforts to educate governments, businesses, and the public on measures they can take to reduce loss and injury.

National Flood Insurance Program: The Federal program, created by an act of Congress in 1968 that makes flood insurance available in communities that enact satisfactory floodplain management regulations.

One-Hundred (100) Year Flood: The flood elevation that has a one-percent chance of being equaled or exceeded in any given year. It is also known as the base flood elevation.

Preparedness: The range of deliberate, critical tasks and activities necessary to build, sustain, and improve the operational capability to prevent, protect against, respond to, and recover from domestic incidents. Preparedness is a continuous process.

Preparedness involves efforts at all levels of government and between government and private-sector and nongovernmental organizations to identify threats, determine vulnerabilities, and identify required resources. Within the NIMS, preparedness is operationally focused on establishing guidelines, protocols, and standards for planning, training and exercises, personnel qualification and certification, equipment certification, and publication management.

Prevention: Actions to avoid an incident or to intervene to stop an incident from occurring. Prevention involves actions to protect lives and property. It involves applying intelligence and other information to a range of activities that may include such countermeasures as deterrence operations; heightened inspections; improved surveillance and security operations; investigations to determine the full nature and source of the threat; public health and agricultural surveillance and testing processes; immunizations, isolation, or quarantine; and, as appropriate, specific law enforcement operations aimed at deterring, preempting, interdicting, or disrupting illegal activity and apprehending potential perpetrators and bringing them to justice.

Recovery: The development, coordination, and execution of service- and site-restoration plans; the reconstitution of government operations and services; individual, private- sector, nongovernmental, and public-assistance programs to provide housing and to promote restoration; long-term care and treatment of affected persons; additional measures for social, political, environmental, and economic restoration; evaluation of the incident to identify lessons learned; post incident reporting; and development of initiatives to mitigate the effects of future incidents.

Retrofitting: Flood proofing measures taken on an existing structure.

Risk: A measure of the probability that damage to life, property, and/or the environment will occur if a hazard manifests itself; this measure includes the severity of anticipated consequences to people.

Risk Analysis: Assesses probability of damage (or injury) and actual damage (or injury) that might occur, in light of the hazard analysis and vulnerability analysis. Some planners may choose to analyze worst-case scenarios.

Risk Area: An area considered likely to be affected by a natural or technological hazard. Risk areas are based on recommended isolation distances, identifiable land features, etc.

Risk Management: Refers to a decision making process that involves such considerations as risk assessment, technological feasibility, economic information about costs and benefits, statutory requirements, public concerns, and other factors.

Stafford Act: Robert T. Stafford Disaster Relief and Emergency Assistance Act, PL 100-1 07, signed into law November 3, 1988; amended the Disaster Relief Act of 1974, PL 93-288.

Standard Flood Insurance Policy: The flood insurance policy issued by the Federal Insurance Administrator, or an insurer pursuant to an arrangement with the administrator pursuant to federal statutes and regulations.

State Hazard Mitigation Officer: The representative of State government who serves on the Hazard Mitigation Survey Team and Interagency Hazard Mitigation Team and who is the primary point of contact with FEMA, other Federal agencies, and local units of government in the planning and implementation of post-disaster mitigation activities.

Terrorism: Under the Homeland Security Act of 2002, terrorism is defined as activity that involves an act dangerous to human life or potentially destructive of critical infrastructure or key resources and is a violation of the criminal laws of the United States or of any State or other subdivision of the United States in which it occurs and is intended to intimidate or coerce the civilian population or influence a government or affect the conduct of a government by mass destruction, assassination, or kidnapping. See Section 2 (15), Homeland Security Act of 2002, Pub. L. 107-296, 116 Stat. 2135 (2002).

Vulnerability Analysis: Identifies what is susceptible to damage. Should provide information on extent of the vulnerable zone; population, in terms of size and types that could be expected to be within the vulnerable zone; private and public property that may be damaged, including essential support systems and transportation corridors; and environment that may be affected, and impact on sensitive natural areas and endangered species.

Zoning Ordinance: An ordinance under the State or local government's police power that divides an area into districts and, within each district, regulates the use of land and buildings, height, and bulk of buildings or other structures, and the density of population.

APPENDIX B

CRITICAL FACILITIES AND HAZARDS

Appendix B Updates

The LMS Steering Committee developed and adopted a formal definition for the term “critical facility.” According to the adopted definition, “critical facilities comprise all public and private facilities deemed by a community to be essential for the delivery of vital services, protection of special populations and the provision of other services of importance for that community.” Critical facilities include, “hospitals; emergency operation centers; medical facilities, nursing homes, assisted living facilities; key grocery stores; fuel dispensing stations; newspaper facilities; radio broadcasting facilities; Florida Division of Forestry offices; fire stations; law enforcement offices; schools; shelters; government offices; funeral homes; power generating plants; water treatment plants; waste water treatment plants; major water, storm-water, flood, and water control structures; airports; railways; port facilities; roads classified as evacuation routes; and others as identified by the LMS Steering Committee.”

For the purpose of prioritizing proposed mitigation projects, the LMS Steering Committee decided to differentiate between primary and secondary critical facilities. Primary critical facilities are defined as, “facilities that are critical to the immediate support of life and public safety”. Some examples of primary critical facilities include emergency operation centers (EOCs); emergency shelters; fire-rescue and police facilities; hospitals; and major utilities facilities (power generation plants, wastewater treatment plants, etc.). Secondary critical facilities are defined as, “facilities that will be critical for community recovery and the restoration of services”. Some examples of secondary critical facilities include government offices, key grocery stores, newspaper facilities, and non-shelter schools.

Primary Critical Facilities – Facilities Critical to the Immediate Support of Life and Public Safety

Emergency Operations Command and Control Centers (EOCs) and staging areas
Emergency Shelters
Fire-Rescue Command and Control Centers and Facilities
Sheriff’s Office and Police Command and Control Centers and Facilities
Hospitals and Medical Centers
Military and National Guard Facilities and staging areas for military efforts
Emergency Communications Facilities (governmental)
Electric Power Distribution Facilities
Public Communication Facilities
Nursing and Convalescent Facilities
Storm-water Management Facilities
Water/Sewage Treatment Facilities
Potable Water Facilities
Transportation and Debris Removal Equipment Staging, Refueling, and Repair Facilities

Secondary Critical Facilities –Facilities critical for Community Recovery and the Restoration of Services.

Governmental Offices (providing essential restoration services, i.e. utilities restoration, building permits, and the databases required for community service restoration)

Private Not-For-Profit Social Service Agencies and Mental Health Facilities

Debris Collection Sites

Reconstruction Material Suppliers

Financial Institutions

Medical and Urgent Care Clinics, Pharmacies

Food Distribution Centers

Mail Delivery Facilities

Community Centers, Libraries

Schools, Colleges, University

Appendix B

Critical Facilities and Hazards

Critical facilities with Hazards

St. Lucie County Health Care Vulnerability Assessment

Facility Type	Name	Address	City	Zip	DEM Elevation	Surge	Evac Zone	Flood	Fire
ALF	ASSISTED LIVING AND MICRO-COMMUNITY	2897 HARSON WAY	FORT PIERCE	34947	16.82	0	X	OUT	Y
ALF	AURORA OF TREASURE COAST	6609 N. US1	FORT PIERCE	34949	11.99	5	A	100	Y
ALF	BEACHLAND RETIREMENT HOME INC.	462 HERNANDO STREET	FORT PIERCE	34949	3.12	1	A	100	Y
ALF	BOWE, BETTY JEAN	2739 CHEROKEE AVE.	FORT PIERCE	34946	12.03	0	X	OUT	N
ALF	BRENOVIL, ZULIA	902 SE PRESTON LANE	PORT SAINT LUCIE	34983	12.33	0	X	OUT	N
ALF	EBEN EZER ASSISTED LIVING FACILITY	742 S.E. ACADEMY LANE	PORT SAINT LUCIE	34984	4.40	5	B	100	N
ALF	FLORIDA MENTOR	2318 RICH STREET	PORT SAINT LUCIE	34984	9.89	0	X	OUT	N
ALF	FLORIDA MENTOR	111 NE CAPRONA AVENUE	PORT SAINT LUCIE	34983	12.86	0	X	OUT	N
Health	HARMONY HEALTHCARE	534 SE THANKSGIVING AVENUE	PORT SAINT LUCIE	34983	9.39	0	X	OUT	N
ALF	NEW LIFE ASSISTED LIVING FACILITY	2133 S.E. SHELTER DRIVE	PORT SAINT LUCIE	34952	11.15	0	X	OUT	N
ALF	ROYAL CARE A.C.L.F., INC.	5081 DUNN ROAD	FORT PIERCE	34981					
ALF	SUNNYDAYS ALF, INC	169 N.E. PRIMA VISTA BLVD.	PORT SAINT LUCIE	34983	12.02	0	X	OUT	N
ALF	V & R RETIREMENT, INC.	356 SE PRIMA VISTA BLVD.	PORT SAINT LUCIE	34983	17.40	0	X	OUT	N

Primary and Secondary Critical Facilities and Hazards

Facility Type	Name	Address	City	Zip	Dem Elev	Evac Zone	Surge	Fire	Flood
FIRE STATION	ST LUCIE CO FIRE DIST ST 15	721 AVENUE D	FORT PIERCE	34950	11.72	A	0	N	OUT
FIRE STATION	ST LUCIE CO FIRE DIST ST 2	880 SEAWAY DR	FORT PIERCE	34949	5.67	A	2	Y	100
FIRE STATION	ST LUCIE CO FIRE DIST ST 3	250 SW PRIMA VISTA BLVD	PORT ST LUCIE	34983	16.31	X	0	N	OUT
FIRE STATION	ST LUCIE CO FIRE DIST ST 8	7583 S OCEAN DR	JENSEN BEACH	34957	4.34	A	3	Y	100
LAW ENFORCEMENT	FLORIDA DEPT OF LAW ENFORCEMENT FT. PEIRCE FIELD OFFICE	603 N INDIAN RIVER DR	FT. PIERCE	34950	6.80	A	5	N	500
LAW ENFORCEMENT	FLORIDA HIGHWAY PATROL TROOP L	2929 N 25TH ST	FORT PIERCE	34946	17.87	X	0	N	OUT
LAW ENFORCEMENT	PORT ST LUCIE POLICE HEADQUARTERS	121 SW PORT ST LUCIE BLVD	PORT ST LUCIE	34984	9.00	X	0	N	OUT
LAW ENFORCEMENT	ST LUCIE COUNTY SHERIFF-CIVIL	218 S 2ND ST	FORT PIERCE	34950	13.99	A	0	N	OUT
LAW ENFORCEMENT	FORT PIERCE POLICE	920 S US HIGHWAY 1	FORT PIERCE	34950	16	O	O	N	100
LIBRARY	FORT PIERCE BRANCH LIBRARY	101 MELODY LN	FORT PIERCE	34950	4.93	A	3	N	100
LIBRARY	RIVER BRANCH HOMEOWNERS ASSN	5145 WATER LILLY WAY	FORT PIERCE	34981	6.81	A	5	N	OUT
LIBRARY	W GOZDZ ENT LIBRARY MGT & CONS	3880 N HIGHWAY A1A PH 3	FORT PIERCE	34949	6.64	A	3	Y	OUT

Source: Treasure Coast Vulnerability Assessment 2012

Primary and Secondary Critical Facilities and Hazards

Facility Type	Name	Address	City	Zip	Dem Elev	Evac Zone	Surge	Fire	Flood
MOBILE HOME PARK	BENNETTS MOBILE HOME PARK	3426 S 7th St	FORT PIERCE	34982	16.07	X	0	N	OUT
MOBILE HOME PARK	COLONY CLUB MOBILE HOME PARK	2601 N US Highway 1	FORT PIERCE	34946	32.10	X	0	Y	OUT
MOBILE HOME PARK	COUNTRY COVE MOBILE HOME COMMU	4015 N US Highway 1	FORT PIERCE	34946	30.66	X	0	Y	OUT
MOBILE HOME PARK	CYPRESS BAY MOBILE HOME PARK	6545 N US Highway 1	FORT PIERCE	34946	31.65	X	0	N	OUT
MOBILE HOME PARK	EASY LIVIN' R.V. PARK & SALES	4611 S US Highway 1	FORT PIERCE	34982	14.82	X	0	N	OUT
MOBILE HOME PARK	FORT PIERCE FOOD & GAS	2840 N US Highway 1	FORT PIERCE	34946	32.69	X	0	Y	OUT
MOBILE HOME PARK	GLEN OAKS MOBILE HOME PARK	1350 Juanita Ave	FORT PIERCE	34946	29.94	X	0	N	OUT
MOBILE HOME PARK	H AND H MOBILE HOME PARK	6025 N US Highway 1	FORT PIERCE	34946	34.39	X	0	Y	OUT
MOBILE HOME PARK	MANATEE MOBILE HOME & RV PARK	3550 S US Highway 1	FORT PIERCE	34982	19.70	X	0	N	OUT
MOBILE HOME PARK	MARIPOSA ASSOCIATES MHP/PSL MO	3600 SE Mariposa Ave Lot B	PORT SAINT LUCIE	34952	17.82	X	0	N	OUT
MOBILE HOME PARK	PALM VISTA MOBILE RANCH	709 S 33rd St	FORT PIERCE	34947	14.29	X	0	N	OUT
MOBILE HOME PARK	PINE VIEW MOBILE HOME PARK	3265 S US Highway 1	FORT PIERCE	34982	19.15	X	0	N	OUT
MOBILE HOME PARK	PLANTATION MANOR	3200 S US Highway 1	FORT PIERCE	34982	18.86	X	0	N	OUT
MOBILE HOME PARK	RIDGECREST MOBILE HOME PARK	2251 N US Highway 1	FORT PIERCE	34946	40.09	X	0	N	OUT

Source: Treasure Coast Vulnerability Assessment 2012

Primary and Secondary Critical Facilities and Hazards

Facility Type	Name	Address	City	Zip	Dem Elev	Evac Zone	Surge	Fire	Flood
MOBILE HOME PARK	SEMINOLE MOBILE PARK	3318 Orange Ave	FORT PIERCE	34947	19.08	X	0	N	100
MOBILE HOME PARK	SPANISH LAKES	8200 S US Highway 1	PORT SAINT LUCIE	34952	14.06	X	0	Y	OUT
MOBILE HOME PARK	SPANISH LAKES GOLF VILLAGE	Village Green Dr	PORT ST. LUCIE	34952	11.99	X	0	N	OUT
MOBILE HOME PARK	SPANISH LAKES RIVERFRONT	7901 S US Highway 1	PORT SAINT LUCIE	34952	15.75	X	0	N	OUT
MOBILE HOME PARK	SUNRISE TRAILER & RV PARK, INC	1821 N US Highway 1	FORT PIERCE	34946	21.88	X	0	N	OUT
MOBILE HOME PARK	TALL PINES MOBILE HOME COMMUNI	314 S Erie Dr	FORT PIERCE	34946	13.85	X	0	N	OUT
MOBILE HOME PARK	TANGELO VILLAGE-DIXIE MOBILE H	3135 S US Highway 1	FORT PIERCE	34982	18.59	X	0	N	OUT
MOBILE HOME PARK	TANGLEWOOD MOBILE HOME PARK	345 E Weatherbee Rd	FORT PIERCE	34982	16.95	X	0	N	OUT
MOBILE HOME PARK	TORPEY OAKS MOBILE HOME PARK	4185 John Cook Way	FORT PIERCE	34946	32.38	X	0	Y	OUT
MOBILE HOME PARK	TROPICAL ISLES	281 Tropical Isles Cir	FORT PIERCE	34982	14.38	X	0	N	OUT
MOBILE HOME PARK	WINDSONG MOBILE VILLAGE	3200 S 7th St	FORT PIERCE	34982	18.31	X	0	N	OUT
PUBLIC SCHOOL	FORT PIERCE MAGNET K-8 SCHOOL	1100 DELAWARE AVE	FORT PIERCE	34982	17.51	X	0	N	OUT
PUBLIC SCHOOL	FRANCES K. SWEET ELEMENTARY SCHOOL	1400 AVE Q	FORT PIERCE	34983	16.40	X	0	N	OUT
PUBLIC SCHOOL	LINCOLN PARK ACADEMY	1806 AVE I	FORT PIERCE	34984	20.00	X	0	N	OUT

Source: Treasure Coast Regional Vulnerability Assessment, 2012

Primary and Secondary Critical Facilities and Hazards

Facility Type	Name	Address	City	Zip	Dem Elev	Evac Zone	Surge	Fire	Flood
PUBLIC SCHOOL	NORTHPORT K-8 SCHOOL	250 NW FLORESTA DR	PORT ST LUCIE	34985	15.36	X	0	N	OUT
PUBLIC SCHOOL	PORT ST. LUCIE ELEMENTARY SCHOOL	198 NW MARION AVE	PORT ST LUCIE	34987	16.59	X	0	N	OUT
PUBLIC SCHOOL	RIVERS EDGE ELEMENTARY SCHOOL	5600 NE ST JAMES DR	PORT ST LUCIE	34988	16.21	X	0	N	OUT
PUBLIC SCHOOL	SOUTHERN OAKS MIDDLE SCHOOL	5500 NE ST JAMES DR	PORT ST LUCIE	34989	16.04	X	0	N	OUT
PUBLIC SCHOOL	ST. LUCIE MIGRANT CENTER	310 B PRESTON COURT	FORT PIERCE	34990	17.29	X	0	N	OUT
PUBLIC SCHOOL	SUNRISE ACADEMY	2102 AVE Q	FORT PIERCE	34991	19.37	X	0	N	OUT
PUBLIC SCHOOL	WHITE CITY ELEMENTARY SCHOOL	905 W 2ND ST	FORT PIERCE	34992	15.60	X	0	N	OUT
PUBLIC WATER SUPPLY	BLUE HERON MOBILE HOME PARK	4782 NE BLUE HERON LANE	JENSEN BEACH	34957	7.26	D,E	4	N	100
PUBLIC WATER SUPPLY	COUNTRY COVE MOBILE HOME PARK	4015 NO. FEDERAL HWY.	FORT PIERCE	34950	36.44	X	0	N	OUT
PUBLIC WATER SUPPLY	HARBOR BRANCH OCEANOGRAPHIC IN	5600 U.S. HWY 1 NORTH	FORT PIERCE	34946	9.06	A	4	N	500
PUBLIC WATER SUPPLY	PORT ST LUCIE UTILITIES	900 SE OGDEN LANE	PORT ST LUCIE	34983	12.48	X	0	N	OUT
RECREATION PARK	SAVANNAS RECREATION AREA	1400 E Midway Rd	FORT PIERCE	34982	17.59	X	0	N	100
RECREATION VEHICLE	PORT ST. LUCIE RV RESORT	3703 SE Jennings Rd	PORT SAINT LUCIE	34952	13.96	X	0	N	OUT
STATE GOVERNMENT FACILITY	FHP STATION TRP	2929 N. 25TH ST.(M.L.KING JR)	FORT PIERCE	34954	17.79	X	0	N	OUT

Source, Treasure Coast Regional Vulnerability Assessment, 2012

Facility Type	Name	Address	City	Zip	Dem Elev	Evac Zone	Surge	Fire	Flood
STATE GOVERNMENT FACILITY	FORT PIERCE R S C	337 N 4TH ST (US HIGHWAY 1)	FORT PIERCE	34950	6.12	A	5	N	100
WASTEWATER FACILITY	FPL - ST LUCIE POWER PLANT	6501 S OCEAN DR	JENSEN BEACH	34957	14.85	A	5	Y	100

Appendix C

Forms

- Individual Project Progress Report
- Annual Report
- Mitigation Measure (Project or Initiative) Proposal Form
- Project Ranking Worksheet
- Project Prioritization List

**PROJECT PROGRESS REPORT
ST. LUCIE COUNTY
UNIFIED LOCAL MITIGATION STRATEGY
INDIVIDUAL**

From: LMS Project Coordinator

To: Elected Officials

Date:

Subject: Annual Report of LMS Implementation

Status Project Title:

Problems/Obstacles & Proposed Corrective Action:

Status of Progress:

Name of Report Preparer:

Send to:

LMS Project Coordinator: Thomas Daly E-mail: dalyt@stlucieco.org

Address: St. Lucie County Division of Emergency Management Agency
15305 W. Midway Road, Fort Pierce, Florida 34945

ANNUAL REPORT FORM ST. LUCIE COUNTY UNIFIED LOCAL MITIGATION STRATEGY

From: LMS Coordinator

To: Elected Officials

Date:

Subject: Annual Report of LMS Implementation Status

This report is prepared to inform locally elected officials in St. Lucie County of the progress being made to make our community more disaster-resistant. The following briefly summarizes the status of Existing Projects presently being developed and identifies New Projects expected to be undertaken in the upcoming year.

EXISTING PROJECTS

Rank on PPL	Project Title	Purpose of Project	Status of Completion	Obstacles/ Problem Solution

NEW PROJECTS

PPL Ranking	Project Title	Purpose of Project	Funding Source(s)	Anticipated Problems/ Solutions	Start/ End Dates

CDBG	Community Development Block Grant
DHS	Department of Homeland Security
DRI	Disaster Recovery Initiative
DZM	Coastal Zone Management
EMPA	Emergency Management Preparedness and Assistance Trust Fund
EOC	Emergency Operations Center
FCP	Flood Control Project
HMGP	Hazard Mitigation Grant Program
N/A	Not Available
NFMF	Natural Flood Mitigation Fund
PA	Public Assistance
PDM	Pre-Disaster Mitigation
PDM	Public Works Impact Program
STP	Surface Transportation Program
UN	Unranked

**St. Lucie County Local Mitigation Strategy (LMS) Mitigation
Measure (Project or Initiative) Proposal Form**

Municipality(s)/Agency(s): _____

Contact Person: _____

Office Phone: _____

Fax#: _____

E-mail: _____

Estimated Cost of Project or Initiative \$ _____

Describe the proposed mitigation measure as well as the population that will benefit:

What is the community's loss exposure **before** this mitigation effort? \$ _____

What will be the community's loss exposure **after** this mitigation effort? \$ _____

What is the estimated cost per benefited individual? \$ _____
(project cost/# of benefited individuals)

What is the project's benefit cost ratio? _____

Which LMS goal(s) does the mitigation project address?

Reduce the loss of life and Property	yes	no
Achieve safe and fiscally sound, sustainable communities	yes	no
Facilitate orderly recovery during post-disaster redevelopment	yes	no
Optimize the effective use of all available resources	yes	no

Which LMS hazard(s) does the mitigation project address: Mark with an X

HAZARD	X	HAZARD	X	HAZARD	X
Agricultural Pest &		Civil Disturbance		Communication Failure	
Drought		Epidemic		Erosion	
Extreme Temperature		Flooding		Hazardous Materials	
Hurricane		Immigration Crisis		Lightning	
Power Failure		Radiological Accident		Seismic	
Terrorism		Thunderstorm		Tornado	
Transportation		Wellfield Contamination		Wildland Fire	

St. Lucie County Local Mitigation Strategy (LMS) Mitigation Measure (Project / Initiative) Proposal Form

The Jurisdiction's Comprehensive Growth Management Plan? yes no

Specific Location _____

[illegible]

Other local planning document (which one?)_____ yes no

Other local budgeting document (which one?)_____ yes no

Does this project address issues related to public health, safety, and welfare? Yes no

Nature of critical facility benefited by this mitigation measure?

Primary	Secondary	Not Applicable

What is the life expectancy of the proposed mitigation measure?_____Years

Is there demonstrated public support for this measure: (attach documentation)

Has a public meeting or hearing been held (attach documentation)

Amount of match (funds or in-kind services) \$_____ from _____
(Source of Match)

Date funding will be available? _____

NAME ALL SPONSORS OF THIS PROJECT, WHETHER OR NOT THEY WILL CONTRIBUTE FUNDS

If funding were immediately available, how long would it take until the community began receiving benefits from this mitigation measure?

Respond as completely as possible; attach additional pages as required.

Return completed forms to:

Thomas Daly, Emergency Management Coordinator,
15305 W. Midway Road
Fort Pierce, Florida 34945
Phone: (772) 462-8100
Fax: (772) 462-8484
E-Mail: dalyt@stlucieco.org

APPENDIX D

STAKEHOLDER PARTICIPATION

D.1 BACKGROUND FROM DM2K UPDATE

The ever-increasing time and cost associated with responding to and recovering from disasters has prompted a shift towards planning for disasters before they strike. This shift towards pre-disaster mitigation planning is evident in the Federal Emergency Management Agency's (FEMA) development of the Disaster Mitigation Act of 2000 (see Table E.1). DMA2K requires that local jurisdictions have a natural hazard mitigation plan in place in order to be eligible for hazard mitigation grant funds as well as some pre-disaster assistance programs. The development of DMA2K has created a number of new natural hazard planning responsibilities for both local and State jurisdictions, including identifying hazards, completing risk assessments, and encouraging citizen involvement. With the focus of requirements being on process rather than product, citizen involvement has become a vital component of the mitigation planning process. This Appendix documents the steps taken to include various stakeholder groups and the public in general in the Local Mitigation Strategy (LMS) planning process.

1. The planning process shall include an opportunity for the public to comment on the plan during the drafting stage and prior to plan approval. 44 CFR §201.6(b)(1)
2. The Planning process shall include an opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, and agencies that have authority to regulate development, as well as businesses, academia and other private and non-profit interests to be involved in the planning process. 44 CFR §201.6(b)(2)
3. The plan shall document the planning process used to develop the plan including how it was prepared, who was involved in the process, and how the public was involved. 44 CFR 201.6(c)(1).
4. The plan maintenance process shall include a discussion on how the community will continue public participation in the plan maintenance process. 44 CFR §201.6(c)(4)(iii)

D.2 STEERING COMMITTEE MEETINGS

The main method of involving jurisdictions, community organizations, stakeholders, and the public in the LMS planning process was through the Steering Committee. Individuals and organizations with directives or programs supporting mitigation were invited to become involved in the Steering Committee. The groups listed below were invited to join the Steering Committee during the DMA2K comprehensive update and members have been reaffirmed annually, most recently in February 2016. The LMS Steering Committee meet quarterly to review and rank projects and discuss new projects. The LMS Coordinator is responsible to schedule and facilitate quarterly meetings to update the Prioritized Project List, provide updated information on funding opportunities for State and federal grant programs and update the LMS Strategy. In addition, the coordinator will be periodically updating the Plan with any and all pertinent information on vulnerabilities, hazards, and any and all information regarding application processes, eligibility and other requirements related to the LMS.

BOARD OF
COUNTY
COMMISSIONERS



DEPARTMENT OF
PUBLIC SAFETY

RON PARRISH, MPA
PUBLIC SAFETY
DIRECTOR

February 29, 2016

Dear Steering Committee Member or Designee,

This letter is notice of invitation to the LMS Steering Committee 2016 Kick-Off Meeting and the LMS Plans and Projects Workshop to be held March 9, 2016 at the St. Lucie County Emergency Operations Center, 15305 W. Midway Road, Fort Pierce, Florida, 34945. The Steering Committee Kick-Off meeting will be held from 9:00 am – 12:00 pm – lunch will be served, following lunch, the LMS Plans Projects Workshop will be held from 1:00 pm – 4:00 pm.

The purpose of the Steering Committee meeting is to update the LMS Projects List status, present members with a brief of LMS Plan update process, and provide updated information on project eligibility, application and funding guidelines. Please review projects under your purview and update if applicable to current status.

The Workshop is the first of a four (4) part public comment/input and educational outreach series designed to aid in the update of the comprehensive plan and provide an enhanced understanding of the role of the LMS Strategy in hazard mitigation and increased resiliency in recovery from disasters for County and municipal public and private communities. Each Workshop in the series will provide LMS Plan sections that have been updated by soliciting comments after review and address various elements of the LMS in relation to programs and project activities.

The Florida Division of Emergency Management (FDEM) and the and the Federal Emergency Management Agency (FEMA) requires a comprehensive update to the LMS Plan update at five (5) year intervals pursuant to 44 CFR 201.6; Florida Administrative Code, FAC 27P-22.004; The National Flood Insurance Program (NFIP) as identified by the Disaster Mitigation act of 2000, and the Community Rating System (CRS) floodplain management practices. The St. Lucie Unified Local Mitigation Strategy (LMS) will undergo a comprehensive update in 2016.

Should you need any further information please contact me at your convenience: (772) 462-8110 or parrishr@stlucieco.org. Thank you for your continued commitment.

Sincerely,

Ron Parrish

CHRIS DZADOVSKY, District No. 1 • TOD MOWERY, District No. 2 • PAULA A. LEWIS, District No. 3 • FRANNIE HUTCHINSON, District No. 4 • KIM JOHNSON, District No. 5
County Administrator – Howard N. Tipton
15305 W. Midway Road Fort Pierce, Florida 34945-3438
Phone (772) 462-8110 – Public Safety Office • (772) 465-5770 – 911 Office Line • (772) 462-8100 – Emergency Management
Phone (772) 462-8100 – Radiological • (772) 462-8101 – Marine Safety • (772) 462-8120 – Animal Control

County Website Calendar – Public Notice of Steering Committee meeting March 9, 2016

FILE

HOME

SEND / RECEIVE

FOLDER

VIEW

New Appointment

New Meeting

New Items

New Skype Meeting

Today

Next 7 Days

Day

Work Week

Week

Month

Schedule View

Open Calendar

Calendar Groups

E-mail Calendar

Share Calendar

Publish Online

Calendar Permissions

Search People

Address Book

Find

March 2016

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27

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My Calendars

☒ Calendar - padrickm@stlu...

☐ Calendar - Archive

March 9, 2016

Washington, D.C.

Today 77° F / 65° F

Tomorrow 75° F / 55° F

Saturday 62° F / 40° F

Search Calendar

4 am

5

6

7

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11

12 pm

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6

Wednesday, March 09, 2016

Calendar - padrickm@stlu...

Tom Daly

Kurt Myers

Lessett Lozito

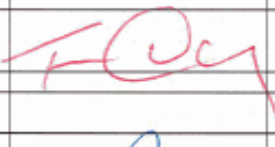
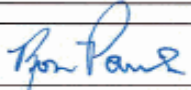










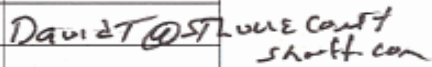

Carolyn Dill-Collier

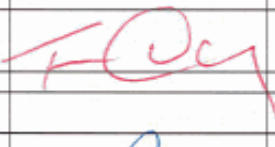
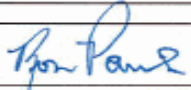










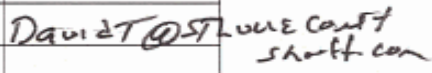

LMS Steering Committee; EOC_Training_F

LMS Workshop; EOC_Training_Rm; Mary Padrick

Staff Meeting EOC_Co Charl

Staff Meeting EOC_Co Charl

Organization	Representative	Alternate Member	Signature	Email	Address	Phone	Cell Phone
St. Lucie County Division of Emergency Management	Thomas Daly			dalyt@stlucieco.org	15305 W. Midway Road Fort Pierce, Florida 34945	772-462-8100 O 772-519-1250 C	
Steering Committee Members							
St. Lucie County Public Safety	Ron Parrish			parrishr@stlucieco.org	15305 W. Midway Road Fort Pierce, Florida 34945	772-462-8110	
St. Lucie County	Patrick Dayan			dayanp@stlucieco.org	2300 Virginia Avenue Fort Pierce, Florida 34982	772-462-1100	
St. Lucie County Utilities	Laurie Waldie			waldiel@stlucieco.org	2300 Virginia Avenue Fort Pierce, Florida 34982	772-462-1846	
St. Lucie County Utilities	Matt Hammond	X		hammondm@stlucieco.org	2300 Virginia Avenue Fort Pierce, Florida 34982	772-462-1134	
St. Lucie Village	William Thiess	X		bbthiess@gmail.com	2512 Lightlewood Fort Pierce, Florida 34946	772-466-8438	
SAFER/St. Lucie	Stefanie Myers		✓	stefanie@harvestfoodoutreach.org	25250 Orange Avenue Fort Pierce, Florida 34947	772-468-8543	
City of Fort Pierce	Tracy S. Telle			TTelle@CITY-FTPIERCE.COM	100 N US Highway 1 Fort Pierce, Florida 34982	772-467-5776	
City of Port St Lucie Utilities Systems	Scott Meagher	Alane Sisilli asisilli@cityofpsl.com 772-873-6400		smeagher@cityofpsl.com	900 SE Ogden Lane Port St. Lucie, Florida 34983	772-344-4035	
City of Port St Lucie	Colt Schwerdt	John Dunton jdunton@cityofpsl.com 772-344-4035		cschwerdt@cityofpsl.com	121 SW Port St. Lucie Boulevard Port St Lucie, Florida 34984	772-871-7644	
Fort Pierce Utilities Authority	Clayton Lindstrom			clindstrom@fpuia.com	206 S. 6th St. Fort Pierce, Florida 34982	772-466-1600	
Fort Pierce Housing Authority	Edgar Kiley			ed.kiley@cfpha.org	511 Orange Avenue Fort Pierce, Florida 34950	772-429-6450 O 772-216-1765 C	
St. Lucie County School District	Marty Sanders			marvin_sanders@stlucieschools.org	4204 Okeechobee Road Fort Pierce, Florida 34947	772-340-7105	
St. Lucie County Sheriff	David Thompson			thompsond@stluciesheriff.com	4700 W. Midway Road Fort Pierce, Florida 3495	772-462-7300	
St. Lucie Fire District	Brian Blizzard			bblizzard@slcfd.org	5760 W. Midway St. Ft. L, FL 34983	772-621-3400	

Organization	Representative	Alternate Member	Signature	Email	Address	Phone	Cell Phone
St. Lucie County Division of Emergency Management	Thomas Daly			dalyt@stlucieco.org	15305 W. Midway Road Fort Pierce, Florida 34945	772-462-8100 O 772-519-1250 C	
Steering Committee Members							
St. Lucie County Public Safety	Ron Parrish			parrishr@stlucieco.org	15305 W. Midway Road Fort Pierce, Florida 34945	772-462-8110	
St. Lucie County	Patrick Dayan			dayanp@stlucieco.org	2300 Virginia Avenue Fort Pierce, Florida 34982	772-462-1100	
St. Lucie County Utilities	Laurie Waldie			waldiel@stlucieco.org	2300 Virginia Avenue Fort Pierce, Florida 34982	772-462-1846	
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SAFER/St. Lucie	Stefanie Myers		✓	stefanie@harvestfoodoutreach.org	25250 Orange Avenue Fort Pierce, Florida 34947	772-468-8543	
City of Fort Pierce	Tracy S. Telle			TTelle@CITY-FTPIERCE.COM	100 N US Highway 1 Fort Pierce, Florida 34982	772-467-5776	
City of Port St Lucie Utilities Systems	Scott Meagher	Alane Sisilli asisilli@cityofpsl.com 772-873-6400		smeagher@cityofpsl.com	900 SE Ogden Lane Port St. Lucie, Florida 34983	772-344-4035	
City of Port St Lucie	Colt Schwerdt	John Dunton jdunton@cityofpsl.com 772-344-4035		cschwerdt@cityofpsl.com	121 SW Port St. Lucie Boulevard Port St Lucie, Florida 34984	772-871-7644	
Fort Pierce Utilities Authority	Clayton Lindstrom			clindstrom@fpuia.com	206 S. 6th St. Fort Pierce, Florida 34982	772-466-1600	
Fort Pierce Housing Authority	Edgar Kiley			ed.kiley@cfpha.org	511 Orange Avenue Fort Pierce, Florida 34950	772-429-6450 O 772-216-1765 C	
St. Lucie County School District	Marty Sanders			marvin_sanders@stlucieschools.org	4204 Okeechobee Road Fort Pierce, Florida 34947	772-340-7105	
St. Lucie County Sheriff	David Thompson			thompsond@stluciesheriff.com	4700 W. Midway Road Fort Pierce, Florida 3495	772-462-7300	
St. Lucie Fire District	Brian Blizzard			bblizzard@slcfd.org	5760 NW Midway St. Ft. L., FL 34983	772-621-3400	

March 9, 2016
9:00 AM - 4:00 PM

LOCAL MITIGATION STRATEGY
PUBLIC SIGN IN

ST. LUCIE COUNTY EOC
15305 W MIDWAY RD
FORT PIERCE, FLORIDA 34945

NAME	ADDRESS	EMAIL	PHONE
Marty Sanders	327 NW Com. Park Dr. PSL	Marty.Sanders@StLucieSchools.org	340 7100 216 5755 c
Carly Swartz	FDEM	Carly.Swartz@em.mylt.	850 519 6734
Eric Crump	ARC	eric.crump@redcross.org	772-618-0998
MATTHEW WEBER	327 NW Com Park Dr, PSL	MATTHEW.WEBER@STLUCIESCHOOLS.ORG	772.788.6619
Matt Hammond	2300 Virginia Ave Ft Pierce	hammondm@stlucieco.org	772 462 1134
Scott Maughan	900 SE OGDEN LANE PSL, FL	Smaughan@cityofpsl.com	561 876 3998
MARK TREMBLAY	9897 Perfect Dr. PSL FL	MARK@STLucie-church.org	772-818-0884
Ron Parrish	E.O.C.	PARRISH@STLUCIECO.ORG	772-462-8204
TRAHEY TELLE	CITY OF FT. PIERCE	TTELLE@CITY-FTPIERCE	772-467-3776
DAVID KOERNER	5150 NW MILNER	DAVID.KOERNER@FLMARLIN	
Melissa Yonas	Peacock Rd	Melissa.Yonas@FreshFrom7.com	772 260 0053 oraida.com
Evan Berry	3209 Virginia Ave	eberry@irsc.edu	772-462-7945
Katherine Schmidt	NSL Blvd	Kschmidt@qecom.com	561-603-9545
EDGAK Kiley	511 ORANGE AVE FT PIERCE	ED.Kiley@CFPHA.org	772 429 6450
BRIAN BLIZZARD	5160 NW MILNER DR.	bblizzard@SLCFD.org	772-201-1773
Rogelio Gonzalez	1505 Orange Ave FP 34550	rgonzalez@consli.com	772 345-8216
Stefanie Myers	2520 Orange Ave FP	Stefanie@upcenter.org	772-595-3995
Colt Schwerdt	City of Port St. Lucie	Cschwerdt@cityofpsl.com	772-871-7644
Kathy LaMartina	421 Camden Ave. Stuart	KLAMART@STFWIND.COM	561 602-8407
BOB ADOLPHE	2300 Virginia Ave, Ft Pierce	adolphe@stlucieco.org	772 462-1753
DAVID M. BLOCK	2555 SHUMARD OAK BLVD TALLAHASSEE	DAVID.BLOCK@EM.MYFLORIDA.COM	850 413 9959
Kate Pau	121 SW Camden Ave. Stuart, FL 34984	KPau@TERPC.org	772-221-4060

**St. Lucie County Unified Local Mitigation Strategy
(LMS)
Steering Committee Meeting
St. Lucie County Emergency Operations Center
15305 West Midway Road
Ft. Pierce, FL 34945
Minutes
March 9, 2016**

Attendants:

Stefanie Myers Vice-Chair, SAFER St. Lucie
Tom Daly, St. Lucie County Emergency Management
Ron Parrish, St. Lucie County Public Safety
Kathryn E. Boer, Treasure Coast Regional Planning Council
Patrick Dayan, St. Lucie County Public Works
Laurie Waldie, St. Lucie County Utilities
Matt Hammond, St. Lucie County Utilities
Tracy S. Telle, City of Fort Pierce
Scott Meagher, City of Port St. Lucie Utilities
Colt Schwerdt, City of Port St. Lucie
Clayton Lindstrom, Fort Pierce Utilities Authority
Edgar Kiley, Fort Pierce Housing Authority
Marty Sanders, St. Lucie County School District
David Thompson, St. Lucie County Sheriff Office
Brian Blizzard, St. Lucie County Fire District
Roje Gonzales, St. Lucie County Council on Aging
Peter Buchwald, St. Lucie County Transportation Planning Organization
Evan Berry, Indian River State College
David Koerner, Florida Department of Health at St. Lucie County
Melissa Yunas, Florida Forest Service
Amy Brunjes, Florida Power & Light
Katherine Schmidt, North St. Lucie County Water Control District
Kathy LaMartina, South Florida Water Management District
Carly Swartz, Florida Division of Emergency Management
Eric Crump, American Red Cross
Matthew Weber, St. Lucie County School District
Mark Tremblay, St. Lucie County Chamber of Commerce
Bob Adolphe, St. Lucie County Board of Commissioners

The Local Mitigations Strategy (LMS) Steering Committee Meeting was called to order at 9:00 am at the Emergency Operation Center, 15305 West Midway Road, Ft. Pierce, FL 34945 by Ron Parrish, Director of St. Lucie County Public Safety.

Ron Parrish welcomed the Committee Members and thanked the members for serving. He stated their commitments, expertise and efforts were very much appreciated. He explained to the committee, the 2016 LMS plan is currently expired and is being updated. He stated the Steering Committee is responsible for the updates to the status of the projects, submissions, along with prioritization of new projects and to establish rankings of the projects. He explained an approved adopted LMS will allow the Committee to take advantage of State /Federal funding for planning and construction projects. He said the updated Plan and Projects List will enable the Committee to implement mitigation strategies to protect assets from potential disaster impacts while increasing resiliency in our recovery from those disasters.

David Block, Florida Division of Emergency Management explained the LMS needs to be updated from its current 2010 version. He said St. Lucie County is not eligible for funding this year due to, not being compliant with the plan. He presented a few slide and discussed briefly the Local Mitigation Strategy Program benefits. He explained the LMS Plan should contain information for a one stop shopping for County and Municipal governments for Planning. It should provide demographics, land use, developments, critical infrastructure, hazards and vulnerabilities and government resources. He stated an approved/adopted LMS qualifies St. Lucie County for multiple grant funding opportunities that can facilitate the construction of projects that mitigate disaster impacts. He said proactive mitigation policies and action help reduce risk and create safer, more disaster resilient community. He explained, as per, Disaster Mitigation Act of 2000 (DMA2K), 44 CFR 201.4 State Mitigation Plan and 44 CFR 201.6 for Local Mitigation Plans, State/FEMA approved, and local government adopted LMS plans are required to be eligible for federal and State mitigation grant funds for planning, Management and Construction of projects. He stated one of the most important steps to updating your plan is to refine the community's mitigation strategy, particularly in light of experiences gained from the implementation of the previous plan. To continue to be an effective representation of the jurisdictions overall strategy for reducing risk to natural hazards, the updated local mitigation plan must reflect current conditions and progress in mitigation efforts. The mitigation strategy should also be revised following disasters to determine if the recommended actions are still appropriate given the impacts of the event.

Clayton Lindstrom questioned the funding for this year. Kate Boer said there was \$587,000 for Pre-Disaster Mitigation (PDM).

Marty Sanders questioned the eligibility for this year. Kate Boer explained St. Lucie County LMS Plan had expired therefore, not eligible for any monies this year.

Tom Daly, St. Lucie County Emergency Management asked David Block if the Flood Mitigation Assist (FMA) and Pre Disaster Mitigation (PDM) are competitive grants. David Block explained they are competitive grants.

Patrick Dayan, St. Lucie County Water Quality Manager, explained the National Flood Insurance Program (NFIP). He said an adopted LMS Plan allows counties and municipalities to utilize the NFIP for options to purchase flood insurance at significantly reduced rate, up to 45% discount.

He stated the Community Rating System (CRS) is how the discounts are based. St. Lucie County is currently at a count 6 which allows for a 10% discount. He also gave a brief description on Flood Insurance Rate Maps (FIRM) for home insurance evaluation.

Tom Daly stated the CRS has a lot of points left off. He said the State is going to evaluate this at the next meeting. He said the goal is to get the points at a 5 or under Statewide.

Kate Boer explained there is a LMS Workshop being held this afternoon at this same location and all Committee Members are invited to stay for the workshop. She said the workshop will cover LMS Process overview. She explained Florida Division of Emergency Management (FDEM) is the only state authorized to review and approve LMS for FEMA. She said plans must document change in development, priorities and mitigation efforts.

Tom Daly stated there have been no changes to criteria within 2005 & 2010

Kate Boer stated there is an annual review of the Project List and Plan/Strategy updates along with a Comprehensive Emergency Management Plan (CEMP) update every five years.

Kate Boer explained the time needed for public comment, Steering Committee review and edits.

Tom Daly stated the updates need to include the Project List, therefore he asked the Committee Members to look at their projects and decide to keep, toss or revise the projects. Tom Daly said it would be fine if the Committee Members get the updated information to the projects to him by the end of the month, if it is not available today,

Kate Boer explained to the Committee, Tom Daly would be doing the updates to the vulnerability and Hazard chapter and she would be updating all the other chapters.

Mr. Adolphe expressed his concern of terrorism. Kate Boer explained no critical or infrastructure facilities will be available to view in the plan, such as site plans, etc.

Stephanie Myers, Safer St. Lucie County suggested the Ft. Pierce and Port St. Lucie Police Departments be sent an invitation to join the LMS Committee.

Tom Daly went over the Project List with the Committee Members and made necessary adjustments.

Kate Boer stated there will be quarterly meetings and the Committee Members needed to pick a day for these meeting. It was decided, April 15, 2016 will be the Steering Committee review and comments along with the public comments review. April 29, 2016 will be to retrieve comments from all reviews. May 1, 2016 is the date to submit to FDEM for review. May 15-20, 2016 will be the final edits, and resubmit to FDEM for approval. May 26, 2016 will be the Steering Committee Meeting for approval. June 1, 2016 will be the deadline for Committee Final approval, leaving time for a June 7, 2016 Board of County Commission Meeting for adoption and June 8, 2016 submission to municipalities for adoption.

With there being no further business, Melissa Yunas, Florida Forest Service, made a motion to adjourn the meeting. This was seconded by Lorie Waldie, St. Lucie County Utilities. The meeting was adjourned at 11:40 A.M.

**THE NEXT MEETING WILL BE FRIDAY, APRIL 26, 2016, 9:00-12:00
ST. LUCIE COUNTY EMERGENCY OPERATION CENTER,
15305 WEST MIDWAY ROAD
FORT PIERCE**

St. Lucie County LMS Coordinator and Treasure Coast Regional Planning Council staff tasked with updating the LMS in partnership with the St. Lucie County Division of Emergency Management and with regard to the Community Outreach aspect of the LMS, conducted a Public Workshop to discuss the attributes of the LMS Plan, Strategy and Project List. Below is the Agenda and sign in sheet. Most attendees were Steering Committee members and/or their Alternate members.

St. Lucie County Media Relations
2300 Virginia Ave.
Fort Pierce, Fla. 34982
www.stlucieco.gov

For more information, contact:
Erick Gill, Public Information Manager
772-462-1791 / gille@stlucieco.org

FOR IMMEDIATE RELEASE

St. Lucie County Releases 2016 Update of the Local Mitigation Strategy for Public Comment

FORT PEIRCE – Today, the St. Lucie County Local Mitigation Strategy (LMS) Steering Committee posted the 2016 Update of the Local Mitigation Strategy Plan online: www.stlucieco.gov/lms. Copies will also be made available in all branches of the St. Lucie County Libraries as well as the St. Lucie County Administration Building, Fort Pierce and Port St. Lucie City Halls, and the Town of St. Lucie Village Town Hall.

The public is encouraged to review the plan and provide comment on the Steering Committee's priorities to mitigate against future disasters that may affect St. Lucie County.

All comments will be reviewed and considered by the Committee at the Next LMS Steering Committee meeting on Friday April 29 at 9 a.m. The meeting will be held at the St. Lucie County Emergency Operations Center, located at 15305 W. Midway Road, Fort Pierce FL, 3450. The public is invited and encouraged to attend.

The resulting pre- and post-disaster mitigation strategies and projects are supported by a variety of State and federal programs and funding sources, in accordance with the Disaster Mitigation Act of 2000.

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ST. LUCIE COUNTY
Local Mitigation Strategy (LMS)
Steering Committee Meeting



St. Lucie County Public Safety
15305 W. Midway Road, Fort Pierce, Florida 34945
April 29, 2016 9:00 a.m. – 12:00 p.m.

AGENDA

1. Welcome & Introductions
Ron Parrish, Director, St. Lucie County Public Safety
2. Pledge of Allegiance
3. Call to Order – *Stephanie Myers, LMS Vice-Chair*
4. Review and Approval March 9, 2016 Minutes*
Stefanie Myers, LMS Vice-Chair
5. Steering Committee Roles and Responsibilities * - *Tom Daly, LMS Coordinator*
 - Committee Expansion Guidelines
 - Chair Schedule Discussion
6. Update on Planning Process
Tom Daly, LMS Coordinator
Kathryn Boer, Emergency Programs Director, TCRPC
7. LMS Project List Status Updates
Tom Daly, LMS Coordinator
8. Review, Discuss and Adjudicate Steering Committee and Public Comments
Stefanie Myers, LMS Vice-Chair
9. Committee Approval of the LMS Plan *
Stefanie Myers, LMS Vice-Chair
10. LMS Meeting Schedule
Tom Daly, LMS Coordinator
11. Committee and Public Comment
12. Adjourn

**Indicates Committee vote is necessary for the agenda item – Quorum is necessary*

APPENDIX E

PRIORITIZED PROJECT LIST

**The 2016 updated Prioritized Project List (PPL) for St. Lucie County
has been updated at the March 9, 2016 meeting of the Steering Committee.**

Project Id. Nr.	Project Description	Project Cost (\$)	Hazard Mitigated	Jurisdictions Benefitted	Potential Funding Source ¹	Timeframe to Complete Project	Implementation Responsibility	Project Status
10-1	Storm Hardning a FPUA Water Pumping Facility	300,000.00	Hurricanes/Tropical Storms	Fort Pierce St. Lucie County	Federal hazard mitigation grants	< 2 years	Ft. Pierce Utilities Authority	In Porogress
09-2	Mosquito Control Impoundment – Protect impoundment berms from erosion caused by storm surge by installing rip rap.	250,000.00	Erosion, epidemics	All	Mosquito Control District funds. State and federal hazard mitigation grants	< 2 years	St. Lucie County Mosquito Control District	Deferred. Awaiting funding.
09-1	Wind Retrofit Four County Buildings – Logistics Center, Heavy Equipment Storage Building, Ave. C Health Dept. & Airport Administration Building	250,000.00	Hurricane	St. Lucie County	St. Lucie County. State and federal hazard mitigation grants	< 2 years	St. Lucie County Central Services	Deferred. Awaiting funding.
09-4	Phase 1 STEP Tank Replacement – Replace 276 STEP systems for phase 1 in Section 30.	524,000.00	Flood	Port St. Lucie	Port St. Lucie. State and federal hazard mitigation grants	< 2 years	Port St. Lucie Utilities	Ongoing
09-5	Flood Proofing School District Administrative Office	2,600,000.00	Flood	All	Federal hazard mitigation grants	< 2 years	St. Lucie County School District	Deferred. Awaiting funding.
08-10	St. Lucie West Stormwater Improvements	195,000.00	Flood	Port St. Lucie	St. Lucie County. Section 319 grants. State and federal hazard mitigation grants.	< 2 years	St. Lucie West Service District	Deferred. Awaiting funding.
08-12	Provide wind storm mitigation for low income housing	1,000,000.00	Hurricane/ Tropical Storm, Tornado	All	State and federal hazard mitigation grants.	< 2 years	INTACT	Deferred. Awaiting funding.
08-5	Place a new roof on FPUA's Energy Service Center. The building serves as the EOC for FPUA.	500,000.00	Hurricane/ Tropical Storm, Tornado	Fort Pierce	Fort Pierce Utilities Authority. State and federal hazard mitigation grants.	< 6 months	Fort Pierce Utilities Authority	Deferred. Awaiting funding.
08-9	F1 - Install an electric motor on the "Gates Structure" on Canal 1 / Taylor Creek	250,000.00	Flood	St. Lucie County Fort Pierce	FPFWCD, State and federal hazard mitigation grants	< 6 months	Fort Pierce Farms Water Control District	Deferred. Awaiting funding.
08-8	Replace gate lifting shafts and repair the pump house and motors on the "Fittings Structure" on Ten Mile Creek.	225,000.00	Flood	St. Lucie County Fort Pierce Port St. Lucie	NSLRWCD, State and federal hazard mitigation grants.	< 6 months	North St. Lucie River Water Control District	Deferred. Awaiting funding. This project has been combined with project 07-13 and 07-45 in an effort to save money.
08-1	Replace sidelot pipes to reduce flooding.	1,200,000.00	Flood	Port St. Lucie	Port St. Lucie. State and federal hazard mitigation grants.	2-3 years	Port St. Lucie Public Works	Deferred. Awaiting funding.
07-1	Virginia Avenue Basin (Mayflower Canal & U.S. Highway 1 crossing) – Upgrade/replace culvert crossing of the Mayflower Canal and U.S. Highway 1 drainage.	750,000.00	Flood	Fort Pierce St. Lucie County	Fort Pierce, State and federal hazard mitigation grants.	< 2 years	Fort Pierce Public Works	Will advise

Project Id. Nr.	Project Description	Project Cost (\$)	Hazard Mitigated	Jurisdictions Benefitted	Potential Funding Source ¹	Timeframe to Complete Project	Implementation Responsibility	Project Status
07-2	St. Lucie Gardens Stormwater Improvements – Design, permitting, land acquisition, and construction of stormwater project. Multi-phased project.	3,900,000.00	Flood	St. Lucie County	St. Lucie County. Section 319 grants. SLRIT Grants. State and federal hazard mitigation grants.	< 4 years	St. Lucie County Public Works	Deferred. Awaiting funding.
07-7	N-6 (Header Canal – Pump Station No. 2) – Install automatic operation controls on Pump Station No. 2 at the south end of Header Canal.	75,000.00	Flood	St. Lucie County	NSLRWCD. State and federal hazard mitigation grants.	< 2 years	North St. Lucie River Water Control District	Deferred. Awaiting funding.
07-8	N-5 (Header Canal – Pump Station No. 1) – Install automatic operation controls on Pump Station No. 1 at the north end of Header Canal.	75,000.00	Flood	St. Lucie County	NSLRWCD. State and federal hazard mitigation grants.	< 2 years	North St. Lucie River Water Control District	Deferred. Awaiting funding.
07-10	St. Lucie Plaza Drainage Improvements - Design, permitting, land acquisition, and construction of stormwater project. Multi-phased project.	3,000,000.00	Flood	St. Lucie County	St. Lucie County. State and federal hazard mitigation grants.	< 4 years	St. Lucie County Public Works	Deferred. Awaiting funding.
07-11	Harmony Heights Drainage Improvements - Design, permitting, land acquisition, and construction of stormwater project. Multi-phased project.	3,000,000.00	Flood	St. Lucie County	St. Lucie County. Section 319. SLRIT Grant. State and federal hazard mitigation grants.	< 4 years	St. Lucie County Public Works	Phase 1- Complete. Subsequent phases deferred. Awaiting funding.
07-12	Sunland Gardens Drainage Improvements - Design, permitting, land acquisition, and construction of stormwater project. Multi-phased project.	4,250,000.00	Flood	St. Lucie County	St. Lucie County. Section 319. SLRIT Grant. State and federal hazard mitigation grants.	< 4 years	St. Lucie County Public Works	Deferred. Awaiting funding.
07-13	N-4 (Fitting Structure Gates) – Install automatic controls on the “Fitting Structures” gates.	225,000.00	Flood	St. Lucie County	NSLRWCD. State and federal hazard mitigation grants.	< 2 years	North St. Lucie River Water Control District	Deferred. Awaiting funding. This project has been combined with project 08-8 and 07-45 in an effort to save money.
07-15	Emergency Communication Vehicle – Purchase and equip an emergency communication vehicle in order to provide continual broadcast on television during an emergency event.	300,000.00	All	All	St. Lucie County. State and federal hazard mitigation grants.	< 2 years	St. Lucie County Media	Deferred. Awaiting funding.
07-17	N-3 (Gordy Road Structure Gates) – Install automatic controls on the “Gordy Road Structure” gates.	200,000.00	Flood	St. Lucie County Port St. Lucie	NSLRWCD. State and federal hazard mitigation grants.	< 6 months	North St. Lucie River Water Control District	Deferred. Awaiting funding.

Project Id. Nr.	Project Description	Project Cost (\$)	Hazard Mitigated	Jurisdictions Benefitted	Potential Funding Source ¹	Timeframe to Complete Project	Implementation Responsibility	Project Status
07-18	South 7 th Street Drainage Improvements - Design, permitting, land acquisition, and construction of stormwater project. Multi-phased project.	250,000.00	Flood	St. Lucie County	St. Lucie County. Section 319 grants. SLRIT Grants. State and federal hazard mitigation grants.	< 2 years	St. Lucie County Public Works	In progress. Under design
07-19	Carlton Road Drainage Improvements - Design, permitting, land acquisition, and construction of stormwater project. Multi-phased project.	550,000.00	Flood	St. Lucie County	St. Lucie County. Section 319 grants. SLRIT Grants. State and federal hazard mitigation grants.	< 4 years	St. Lucie County Public Works	Deferred. Awaiting funding. Will check
07-20	Paradise Park Drainage Improvements - Design, permitting, land acquisition, and construction of stormwater project. Multi-phased project.	3,000,000.00	Flood	St. Lucie County	St. Lucie County. Section 319 grants. SLRIT Grants. State and federal hazard mitigation grants.	< 4 years	St. Lucie County Public Works	This is a 5-phase project. Phase 1 is completed. Phase 2 is in progress. Phase 3 completed phase 4 ip
07-21	Silver Lake Park Drainage Improvements - Design, permitting, land acquisition, and construction of stormwater project. Multi-phased project.	1,000,000.00	Flood	St. Lucie County	St. Lucie County. Section 319 grants. SLRIT Grants. State and federal hazard mitigation grants.	< 2 years	St. Lucie County Public Works	Deferred. Awaiting funding.
07-22	Wilbure Subdivision Drainage Improvements - Design, permitting, land acquisition, and construction of stormwater project. Multi-phased project.	1,000,000.00	Flood	St. Lucie County	St. Lucie County. Section 319 grants. SLRIT Grants. State and federal hazard mitigation grants.	< 4 years	St. Lucie County Public Works	Deferred. Awaiting funding.
07-23	Bluefield Road Drainage Improvements - Design, permitting, land acquisition, and construction of stormwater project. Multi-phased project.	500,000.00	Flood	St. Lucie County	St. Lucie County. Section 319 grants. SLRIT Grants. State and federal hazard mitigation grants.	< 4 years	St. Lucie County Public Works	Multi-phased project. Phase 1 is completed. Phase 2 is deferred. Awaiting funding. Will check
07-24	White City/Citrus Avenue Drainage Study - Drainage improvements for a severely flood prone subdivision of fifty homesites, on septic tank and well system.	1,500,000.00	Flood	St. Lucie County	St. Lucie County. Section 319 grants. SLRIT Grants. State and federal hazard mitigation grants.	< 2 years	St. Lucie County Public Works	IP completing in 2016.
07-25	Trowbridge Road Drainage Improvements - Design, permitting, land acquisition, and construction of stormwater project. Multi-phased project.	1,000,000.00	Flood	St. Lucie County	St. Lucie County. Section 319 grants. SLRIT Grants. State and federal hazard mitigation grants.	< 4 years	St. Lucie County Public Works	Deferred. Awaiting funding. Checking
07-26	Westmoreland Blvd./Gatlin Culvert - Drainage improvements to a section of Westmoreland Blvd. that is subject to flooding during heavy rains	50,000.00	Flood	St. Lucie County	St. Lucie County. State and federal hazard mitigation grants	< 4 years	St. Lucie County Public Works	Deferred. Awaiting funding. checking

Project Id. Nr.	Project Description	Project Cost (\$)	Hazard Mitigated	Jurisdictions Benefitted	Potential Funding Source ¹	Timeframe to Complete Project	Implementation Responsibility	Project Status
07-27	Indian River Estates Drainage Improvements – Drainage improvements for a severely flood prone subdivision of 1,800 single family homesites, on septic tanks and wells.	4,800,000.00	Flood	St. Lucie County	St. Lucie County. State and federal hazard mitigation grants	4+ years	St. Lucie County Public Works	This is a 2-phased project. Phase 1- pump station & treatment pond- completed. Phase 2 icomplete 2015 phase 3 in design
07-28	Ten Mile Creek (Regional Attenuation Facility) – joint project between St. Lucie County, U.S. Army Corps of Engineers, and South Florida Water Management District to construct a regional storage reservoir for stormwater within a flood prone river flood plain area affecting approximately 50 homesites.	30,000,000.00	Flood	St. Lucie County Fort Pierce Port St. Lucie	Army Corps of Engineers	N/A	St. Lucie County	In progress
07-134	Access Route Clearing Equipment – Hitch and light trailer equipped with items including but not limited to: hand tools, chain saws, ropes and tackle, to enable trained personnel to readily clear routes to critical facilities and neighborhoods	10,000.00	Flood, Hurricanes / Tropical Storm, Tornadoes, Severe Thunderstorm& Lightning, Seismic Hazards, Technological, Societal	All	St. Lucie County Sheriff's Office, Homeland Security Grants, State and federal hazard mitigation grants.	6 months	St. Lucie County Sheriff's Office	Deferred. Awaiting funding.
07-37	F-2 (Canal No. 21 culvert replacement) – Replace the existing 36-inch diameter gated culvert connection between Canal No. 21 and C-25 of the South Florida Water Management District with a 72-inch diameter weir-control gate.	300,000.00	Flood	St. Lucie County Fort Pierce	FPFWCD. State and federal hazard mitigation grants.	< 2 years	Fort Pierce Farms Water Control District	Deferred. Awaiting funding. Checking
07-39	Airosa Culverts at Eyerly – Replacement of culverts at Airosa & Eyerly to a larger sized culvert due to severe flood after heavy rains	300,000.00	Flood	Port St. Lucie	Port St. Lucie. State and federal hazard mitigation grants.	< 2 years	Port St. Lucie Public Works	Deferred. Awaiting funding. checking
07-42	Comprehensive Drainage Plan – Identify the sub-basin, determine necessary improvements, and long-term maintenance of stormwater within the Village.	100,000.00	Flood	St. Lucie Village	St. Lucie Village. State and federal hazard mitigation grants.	< 1 year	St. Lucie Village	Deferred. Awaiting funding.
07-45	N-7 (Radial Gates) – Replace the radial gates on the "Fitting Structure" with stainless steel gates.	225,000.00	Flood	St. Lucie County	FPFWCD. State and federal hazard mitigation grants	< 2 years	North St. Lucie River Water Control District	Deferred. Awaiting funding. This project has been combined with project 08-8 and 07-13 in an effort to save money. Checking

Project Id. Nr.	Project Description	Project Cost (\$)	Hazard Mitigated	Jurisdictions Benefitted	Potential Funding Source ¹	Timeframe to Complete Project	Implementation Responsibility	Project Status
07-48	Easy Street – Replacement of all cross pipes at Buchanan Dr., Pinetree Dr., Palmetto Dr., Silver Oak Dr., Seagrape Dr., Myrtle Dr., Birch Dr., Hickory Dr., Raintree Trail, Tangelo Dr., Spruce Dr., Cassia Dr., Bamboo Dr., Balsam Dr., Papaya Dr., and Yucca Dr.	150,000.00	Flood	St. Lucie County	St. Lucie County. State and federal hazard mitigation grants.	< 4 years	St. Lucie County Public Works	Phaes 3 of IRE 27, deferred phase 4
07-51	Road Restoration and Improvement - Initiation of a study to evaluate the condition of roads within the Village and then prioritize road restoration projects to ensure the most deteriorated facilities are brought into conformance.	Not Available	Floods. Hurricane / Tropical Storm, Technological	St. Lucie Village	St. Lucie Village	< 1 year	St. Lucie Village	Deferred. Awaiting funding.
07-55	Merritt Ditch & Sunrise Blvd. Crossing – Replacement of 60-inch pipe.	75,000.00	Flood	St. Lucie County	St. Lucie County. State and federal hazard mitigation grants.	18 months	St. Lucie County Public Works	Deferred. Awaiting funding. C checking
07-56	Merritt Ditch & Elm Street Crossing – Replacement of 60-inch pipe.	75,000.00	Flood	St. Lucie County	St. Lucie County. State and federal hazard mitigation grants.	18 months	St. Lucie County Public Works	Deferred. Awaiting funding.
07-58	Mariposa Ditch – Redesign and reroute of failing ditch.	750,000.00	Flood	St. Lucie County	St. Lucie County. State and federal hazard mitigation grants.	18 months	St. Lucie County Public Works	Deferred. Awaiting funding. checking
07-64	Municipal Water Service – Provide municipal water services to the residents of St. Lucie Village.	Not Available	Epidemic	St. Lucie Village	St. Lucie County. St. Lucie Village.	2 years	St. Lucie Village	Deferred. Awaiting funding.
07-68	National Register Properties Damage Assessment – Assess the exposure to damage by any type of disaster for properties located within the Village's Historic District.	Not Available	All	St. Lucie Village	St. Lucie Village	< 6 months	St. Lucie Village	Deferred. Awaiting funding.
07-69	Comprehensive Emergency Management Plan – Complete a study to determine the appropriate process to handle emergency management in the Village.	Not Available	All	St. Lucie Village	St. Lucie Village, DCA Grants.	1 year	St. Lucie Village	Deferred. Awaiting funding.
07-72	Right of Way Culvert Replacement Project – Replace drainage right-of-way culverts with corrugated metal pipes on failing cross roads.	2,800,000.00	Flood	Port St. Lucie	Port St. Lucie, State and federal hazard mitigation grants.	< 1 year	Port St. Lucie Public Works	In progress. Annual maintenance
07-73	Wildland Fire Mitigation Plan – Research and prepare a wildland fire mitigation plan.	Not Available	Wildland Fire	St. Lucie Village	St. Lucie Village, State and federal hazard mitigation grants.	< 1 year	St. Lucie Village	Deferred. Awaiting funding.

Project Id. Nr.	Project Description	Project Cost (\$)	Hazard Mitigated	Jurisdictions Benefitted	Potential Funding Source ¹	Timeframe to Complete Project	Implementation Responsibility	Project Status
07-74	Wildland Fire Mitigation Plan – City of Port St. Lucie – Preparation of a Wildland Fire Mitigation Plan as part of the Comprehensive Emergency Operations Plan.	100,000.00	Wildland Fire	Port St. Lucie	Port St. Lucie, State and federal hazard mitigation grants.	N/A	Port St. Lucie Emergency Management	Completed
07-75	Transfer of Public Records – Transfer of public records from paper to an optical disc.	40,000.00	Floods, Hurricanes / Tropical Storms, Tornadoes, Severe Thunderstorm & Lightning, Seismic, Technological, Societal	Fort Pierce	Fort Pierce, State and federal hazard mitigation grants.	1 – 2 years	Fort Pierce Public Works	In progress.
07-78	Pet/Small Animal Shelter – Design and construct a pet/small animal shelter.	1,500,000.00	Floods, Hurricanes / Tropical Storm, Severe Thunderstorm & Lightning, Wildland Fire, Extreme Temperature, Seismic, Epidemics, Technological, Societal	All	St. Lucie County, State and federal hazard mitigation grants.	2 years	St. Lucie County Central Services	Deferred. Awaiting funding.
07-79	Vital records protection facility.	600,000.00	Floods, Hurricanes / Tropical Storm, Severe Thunderstorm & Lightning, Wildland Fire, Extreme Temperature, Seismic, Epidemics, Technological, Societal	Port St. Lucie	Port St. Lucie, State and federal hazard mitigation grants.	2 years	Port St. Lucie Public Works	Deferred. Awaiting funding.
07-80	Rivergate (Erosion Control Devices) – Develop and install erosion control barriers along the entire shore of Rivergate Waterway.	Not Available	Flood, Erosion.	Port St. Lucie	Port St. Lucie	2 years	Port St. Lucie Public Works	Deferred. Awaiting funding.
07-81	Recreation Building Upgrades – Retrofit current buildings in parks to current codes (garages, doors).	25,000 per site	Hurricane / Tropical Storm, Tornadoes	Port St. Lucie	Port St. Lucie, State and federal hazard mitigation grants	< 1 year	Port St. Lucie Public Works	Deferred. Awaiting funding.
07-85	Community Rating System Designation – Apply and establish the Village as a participant of the Community Rating System for insurance reductions.	0.00	Flood	St. Lucie Village	St. Lucie Village, State and federal hazard mitigation grants.	< 1 year	St. Lucie Village	In progress
07-88	Horizontal Wells – Provide horizontal wells throughout the County in order to provide access to water during emergencies.	500,000.00	Wildland Fire, Drought	All	St. Lucie County, State and federal hazard mitigation grants	4 + years	St. Lucie County Fire District	Deferred. Awaiting funding. checking

Project Id. Nr.	Project Description	Project Cost (\$)	Hazard Mitigated	Jurisdictions Benefitted	Potential Funding Source ¹	Timeframe to Complete Project	Implementation Responsibility	Project Status
07-89	Acquire properties along the Indian River Lagoon, the St. Lucie River, Ten Mile Creek, Five Mile Creek, tributaries of these waters, the Atlantic Ocean and other flood plain areas to direct residential and commercial development away from coastal and flood plain and to restore the natural floodplain.	13,000,000.00	Flood	All	St. Lucie County, Florida Communities Trust Grants.	Ongoing	St. Lucie County Environmental Resources	In progress. Ongoing project.
07-90	Repetitive Loss Inventory Buyout – Acquire properties located on the repetitive loss inventory to eliminate future flooding of structure.	2,500,000.00	Flood	All	St. Lucie County, State and federal hazard mitigation grants	> 4 years	St. Lucie County Grants / Disaster Recovery	In progress. 7 properties are to be purchased in 2010. checking
07-91	Citrus Avenue Basin Retrofit – Construct a stormwater treatment facility for an 80-acre drainage basin.	1,500,000.00	Flood	Fort Pierce	Fort Pierce, Section 319, SLRIT Grant, State and federal hazard mitigation grants.	4+ years	Fort Pierce Public Works	Deferred. Awaiting funding.
07-94	Public Works Facility – Construct a new Public Works Facility adjacent to the Florida Turnpike.	3,500,000.00	Floods, Hurricanes / Tropical Storm, Severe Thunderstorm & Lightning, Wildland Fire, Extreme Temperature, Seismic, Epidemics, Technological, Societal	Port St. Lucie	Port St. Lucie, State and federal hazard mitigation grants.	< 4 years	Port St. Lucie Public Works	Deferred. Awaiting funding.
07-96	Watershed "A" – West E-84 Improvements – Improvements to the E5 and E-84 drainage canals and E-84 drainage basin to reduce flooding hazard	1,210,000.00	Flood	Port St. Lucie	Port St. Lucie, State and federal hazard mitigation grants.	18 months	Port St. Lucie Public Works	Deferred. Awaiting funding.
07-98	St. Lucie North – Construct improvements to the C-104, C-105, C106, C-107, and C-108 drainage canals to reduce flooding hazards	1,200,000.00	Flood	Port St. Lucie	Port St. Lucie, State and federal hazard mitigation grants.	2 years	Port St. Lucie Public Works	Completed
07-99	Cameo Boulevard/Turtle Run Park Debris Storage Area – Develop/Identify an area for emergency management debris removal and storage, including construction of infrastructure to reach site and area for mass temporary housing.	500,000.00	Flood, Hurricane / Tropical Storm, Tornadoes	Port St. Lucie	Port St. Lucie, State and federal hazard mitigation grants.	< 2 years	Port St. Lucie Public Works	Deferred. Awaiting funding.
07-100	Collect data for infrastructure and critical facilities	Not Available	All	All	St. Lucie County	Ongoing	St. Lucie County Public Safety	In progress. Project is considered to be ongoing.
07-101	Collect data to improve future loss estimation efforts.	Not Available	All	All	St. Lucie County	Ongoing	St. Lucie County Public Safety	In progress. Project is considered to be ongoing.

Project Id. Nr.	Project Description	Project Cost (\$)	Hazard Mitigated	Jurisdictions Benefitted	Potential Funding Source ¹	Timeframe to Complete Project	Implementation Responsibility	Project Status
07-105	Identify areas that may require Flood Insurance Rate Map (FIRM) revisions or amendments due to mitigation or development.	Not Available	Flood	All	St. Lucie County	Ongoing	St. Lucie County Public Works	In progress. Project is considered to be ongoing.
07-107	Four-wheel drive Risk/Threat Assessment, Search and Rescue vehicles – Acquire 6 4-wheel drive vehicles for Police Department for risk/threat assessment, search and rescue and ability to deliver supplies and personnel to flooded or damaged areas.	184,200.00	Flood, Hurricane / Tropical Storm, Tornado	Fort Pierce	Fort Pierce, State and federal hazard mitigation grants.	< 2 years	Fort Pierce Police Department	Deferred. Awaiting funding.
07-111	Water Control Structure 53-4 Replacement and Canal Stabilization – Replace failed drainage connection to SFWMD C-25 Canal to enhance flood protection for the surrounding residential and agricultural area of roughly 4000 acres.	150,000.00	Flood	Fort Pierce, St. Lucie County	NSLRWCD, State and federal hazard mitigation grants.	1 year	North St. Lucie River Water Control District	Deferred. Awaiting funding.
07-112	Water Control Structure 33-2 Replacement and Canal Stabilization – Replace failed drainage connection to SFWMD C-25 Canal to enhance flood protection for the surrounding residential and agricultural area of roughly 4000 acres.	750,000.00	Flood	Fort Pierce St. Lucie County	NSLRWCD, State and federal hazard mitigation grants.	1 year	North St. Lucie River Water Control District	Deferred. Awaiting funding.
07-116	Reverse Osmosis Plant Shuttering	250,000.00	Hurricane / Tropical Storm, Tornadoes	Port St. Lucie	Port St. Lucie, State and federal hazard mitigation grants.	< 1 year	Port St. Lucie Utilities	Deferred. Awaiting funding.
07-117	Shuttering of Utilities Administration Building	330,000.00	Hurricane / Tropical Storm, Tornadoes	Port St. Lucie	Port St. Lucie, State and federal hazard mitigation grants.	< 1 year	Port St. Lucie Utilities	Deferred. Awaiting funding. checking
07-118	Provide windstorm damage mitigation and hurricane preparedness educational programming to the community and also to deliver information/resources regarding building codes, wind-load design and wind resistant technology to the building/construction industry.	400,000.00	Hurricane / Tropical Storm, Tornadoes	All	State and federal hazard mitigation grants	Ongoing	St. Lucie County Cooperative Extension Service – University of Florida	In progress. Project is considered to be ongoing.
07-123	Enhancement of Sheriff's Office Emergency Operations Center – Including but not limited to: additional phone line/jacks, dedicated computer, wall mounted map, fans, secure satellite dishes, wall mounted television, ceiling mounted projector	17,000,000.00	All	All	St. Lucie County Sheriff's Office, Homeland Security Grants, State and federal hazard mitigation grants.	1 year	St. Lucie County Sheriff's Office	Deferred. Awaiting funding. checking

Project Id. Nr.	Project Description	Project Cost (\$)	Hazard Mitigated	Jurisdictions Benefitted	Potential Funding Source ¹	Timeframe to Complete Project	Implementation Responsibility	Project Status
07-124	Camp – The administration bldg. is used as a "camp" as defined by ICS. Includes but not limited to: connecting existing generator to lift station; installing stainless double sink and additional kitchen appliance circuits; etc.	99,030.00	All	All	St. Lucie County Sheriff's Office, Homeland Security Grants, State and federal hazard mitigation grants.	6 months	St. Lucie County Sheriff's Office	Deferred. Awaiting funding.
07-125	Epix Digital Imaging System – Portable digital X-ray system to safely explore interior of a suspicious package. Team serves 3 counties and 2 RDSTF regions.	23,000.00	Technological,Societal	All	St. Lucie County Sheriff's Office, Homeland Security Grants, State and federal hazard mitigation grants.	< 1 year	St. Lucie County Sheriff's Office	Deferred. Awaiting funding.
07-127	Roadside Message Board Systems – One vehicle capable of towing 4,000 pound trailer, 2 trailers equipped with solar energy powered electronic message boards that can be transported to incident scenes to provide curfew, evacuation or other important information.	70,000.00	All	All	St. Lucie County Sheriff's Office, Homeland Security Grants, State and federal hazard mitigation grants.	< 1 year	St. Lucie County Sheriff's Office	Received 2 message boards from FDOT. Deferred. Funding for two vehicle is still needed.
07-128	Six satellite phones to allow communications between key Sheriff's Office Emergency managers/commanders, when cellular and radio communications are overwhelmed during a disaster or major event	30,000.00	All	All	St. Lucie County Sheriff's Office, Homeland Security Grants, State and federal hazard mitigation grants.	6 months	St. Lucie County Sheriff's Office	Received 1 fixed and 2 mobile satellite phone. Deferred. Funding for the remaining equipment is still needed.
07-129	EOC Base Station – Need base station radio installed at EOC for Emergency Management use.	3,500.00	All	All	St. Lucie County Sheriff's Office, Homeland Security Grants, State and federal hazard mitigation grants.	6 months	St. Lucie County Sheriff's Office	Checking
07-130	Emergency Responders Assistance Equipment – Hitch, light trailer, equipment and supplies, including but not limited to: air compressor, nail gun, ladders, supply of tarps, etc. to mitigate further damage to the homes of first responders and 24/7 essential	7,000.00	All	All	St. Lucie County Sheriff's Office, Homeland Security Grants, State and federal hazard mitigation grants.	6 months	St. Lucie County Sheriff's Office	Deferred. Awaiting funding.
07-131	Electronic Security System – Install digital video security system where none currently exists and upgrade portal entry system to proximity card system that works in conjunction with video recording system, to be installed at Sheriff's Admin. Office	110,000.00	All	All	St. Lucie County Sheriff's Office, Homeland Security Grants, State and federal hazard mitigation grants.	6 months	St. Lucie County Sheriff's Office	Deferred. Awaiting funding.

Project Id. Nr.	Project Description	Project Cost (\$)	Hazard Mitigated	Jurisdictions Benefitted	Potential Funding Source ¹	Timeframe to Complete Project	Implementation Responsibility	Project Status
07-132	Bi-Directional Amplifiers – Due to heavy construction of school buildings, Sheriff and PSLPD officers cannot communicate effectively with cellular or 800 Mhz radios.	320,000.00	All	All	St. Lucie County Sheriff's Office, Homeland Security Grants, State and federal hazard mitigation grants.	6 months	St. Lucie County Sheriff's Office	In Progress. Partial funding has been received for this project.
07-134	Access Route Clearing Equipment – Hitch and light trailer equipped with items including but not limited to: hand tools, chain saws, ropes and tackle, to enable trained personnel to readily clear routes to critical facilities and neighborhoods	10,000.00	Floods, Hurricanes / Tropical Storm, Severe Thunderstorm & Lightning, Wildland Fire, Extreme Temperature, Seismic, Epidemics, Technological, Societal	All	St. Lucie County Sheriff's Office, Homeland Security Grants, State and federal hazard mitigation grants.	6 months	St. Lucie County Sheriff's Office	Deferred. Awaiting funding.
07-135	Construct safe spaces at Central Services Building and Road and Bridge Department so that first responders will be safe during storm events	100,000.00	Hurricane / Tropical Storms, Tornadoes	St. Lucie County	N/A	N/A	St. Lucie County Central Services	Deferred. Awaiting funding.
07-136	Relocate the wastewater treatment plant located immediately adjacent to the Indian River Lagoon in Fort Pierce. Shoreline erosion, which was severely aggravated by two recent hurricanes, is jeopardizing the plant.	60,000,000.00	Hurricane / Tropical Storm, Tornado, Epidemics, Technological, Societal	All	St. Lucie County, EPA /DEP grants, Legislative Earmark, State and federal hazard mitigation grants.	> 3 years	Fort Pierce Utilities Authority	Deferred. Awaiting funding.
07-137	Remove Australian pine and other woody invasive and exotic plant species along Highway A1A on South Hutchinson Island and create a water barrier to prevent their regeneration to reduce downed power lines and impeding traffic on Highway A1A.	1,000,000.00	Flood, Hurricane / Tropical Storms, Tornadoes	St. Lucie County	St. Lucie County, State and federal hazard mitigation grants.	1 year	St. Lucie County Mosquito Control	About 50% of the project has been completed. Deferred. The remainder of the project is still awaiting funding.
07-148	Emergency Access Bridge Connection – Design and construct a bridge over Five Mile Creek to allow emergency services unimpeded access to entire campus without delays for the benefit of those who use the campus	1,000,000.00	Floods, Tornadoes, Seismic, Technological, Societal	All	Indian River State College, State and federal hazard mitigation grants.	< 2 years	Indian River State College	Deferred. Awaiting funding. checking
07-149	Marine Science Center Flood Protection – Waterproofing and stormwater removal measures to prevent flooding of college building on South Hutchinson Island	150,000.00	Flood	All	Indian River State College, State and federal hazard mitigation grants.	2+ years	Indian River State College	Deferred. Awaiting funding. checking
07-150	Campus drainage infrastructure refurbishment and maintenance – cleaning and replacement of Main Campus drainage infrastructure to significantly lessen the potential for severe flooding	175,000.00	Flood	All	Indian River State College, State and federal hazard mitigation grants.	< 4 years	Indian River State College	Deferred. Awaiting funding. checking

APPENDIX F
Adoption Resolutions

RESOLUTION 11-R63

A RESOLUTION PROVIDING FOR THE ADOPTION OF THE UNIFIED LOCAL
MITIGATION STRATEGY PROGRAM FOR ST. LUCIE COUNTY; PROVIDING AN
EFFECTIVE DATE.

WHEREAS, in 1999 the City of Port St. Lucie entered into an interlocal agreement with the St. Lucie County Board of County Commissioners to develop a Local Mitigation Strategy Program in conjunction with the Florida Department of Community Affairs; and

WHEREAS, pursuant to that interlocal agreement, city staff has actively participated in the development of a Unified Local Mitigation Strategy Program for St. Lucie County; and

WHEREAS, in 2000 the City of Port St. Lucie by Resolution 00-R-31, adopted on July 10, 2000, approved the Unified Local Mitigation Strategy Program for the City of Port St. Lucie; and

WHEREAS, the St. Lucie County Board of County Commissioners by Resolution 05-073, adopted on February 22, 2005, approved the Unified Local Mitigation Strategy Program for St. Lucie County; and

WHEREAS, the City of Port St. Lucie by Resolution 05-R53, adopted on July 25, 2005, approved the updated Unified Local Mitigation Strategy Program for St. Lucie County as approved by the St. Lucie County Board of County Commissioners by Resolution 05-073; and

WHEREAS, the St. Lucie County Board of County Commissioners by Resolution 10-299, adopted on November 23, 2010, adopted the St. Lucie County Local Mitigation Strategy Plan; and

RESOLUTION 11-R63

WHEREAS, the City Council of the City of Port St. Lucie deems it appropriate to approve and adopt the St. Lucie County Local Mitigation Strategy Plan (Unified Local Mitigation Strategy Program).

NOW, THEREFORE, BE IT RESOLVED BY THE CITY COUNCIL OF THE CITY OF PORT ST. LUCIE AS FOLLOWS:

Section 1. The City of Port St. Lucie hereby approves and adopts the St. Lucie County Local Mitigation Strategy Plan, also referred to as the Unified Local Mitigation Strategy Program, as approved by the St. Lucie County Board of County Commissioners by Resolution 10-299, a copy of which is attached hereto as Exhibit "A" and incorporated herein.

Section 2. The Unified Local Mitigation Strategy Program is hereby incorporated as a part of the City of Port St. Lucie's Comprehensive Emergency Operations Plan.

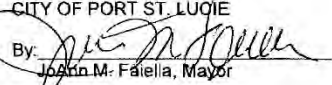
Section 3. This resolution shall become effective immediately upon its adoption.

PASSED AND APPROVED by the City Council of the City of Port St. Lucie, Florida, this 19th day of September, 2011.

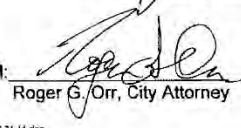
ATTEST:


Karen A. Phillips, City Clerk

CITY COUNCIL
CITY OF PORT ST. LUCIE

By: 
John M. Falella, Mayor

APPROVED AS TO FORM:


Roger G. Orr, City Attorney

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EXHIBIT A

RESOLUTION 10-299

A RESOLUTION ADOPTING THE ST. LUCIE COUNTY LOCAL MITIGATION
STRATEGY PLAN

WHEREAS, the Board of County Commissioners of St. Lucie County, Florida, has made the following determinations:

1. The Disaster Mitigation Act of 2000 (DMA2K) requires that all communities, tribes, and states have a Federal Emergency Management Agency (FEMA) approved hazard mitigation plan, consistent with the DMA2K requirements, to retain eligibility for FEMA hazard mitigation grant funding.

2. A FEMA approved hazard mitigation plan is required for the purpose of certifying compliance with the requirements of the National Flood Insurance Rate Program.


3. On August 20, 2010, FEMA found the St. Lucie County Local Mitigation Strategy Plan compliant with federal standards subject to formal adoption.

NOW, THEREFORE, BE IT RESOLVED by the Board of County Commissioners of St. Lucie County, Florida that this Board does hereby adopt the St. Lucie County Local Mitigation Strategy Plan.

Chris Craft, Chairman	AYE
Chris Dzadosky, Vice Chairman	AYE
Commissioner Tod Mowery	AYE
Commissioner Paula A. Lewis	AYE
Commissioner Frannie Hutchinson	AYE


PASSED AND DULY ADOPTED this 23rd day of November, 2010.

ATTEST:


DEPUTY CLERK



BOARD OF COUNTY COMMISSIONERS
ST. LUCIE COUNTY, FLORIDA

BY: 
CHAIRMAN

APPROVED AS TO LEGAL FORM AND
CORRECTNESS:


COUNTY ATTORNEY

RESOLUTION NO. 11-08

**A RESOLUTION OF THE CITY COMMISSION OF THE
CITY OF FORT PIERCE, FLORIDA, ADOPTING THE ST.
LUCIE COUNTY LOCAL MITIGATION STRATEGY.**

WHEREAS, Chapter 163, Florida Statutes, requires the City of Fort Pierce to plan for hazard mitigation, hurricane evacuation, post-disaster redevelopment, and to participate in a Local Mitigation Strategy; and

WHEREAS, the City of Fort Pierce is required to submit an annual report to the Community Ratings Service (CRS) for the purpose of certifying compliance with the requirements for the National Flood Insurance Rate Program; and

WHEREAS, The Community Rating Services (CRS) has advised the City of Fort Pierce that the St. Lucie County Local Mitigation Strategy would satisfy the requirements of a Floodplain Management Plan, resulting in a higher level of compliance with the National Flood Insurance Rate Program and a reduction in Flood Insurance premiums for the residents of the City of Fort Pierce; and

WHEREAS, on August 20, 2010, the Federal Emergency Management Agency found the St. Lucie County Local Mitigation Strategy compliant with Federal Standards, subject to formal adoption.

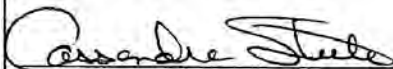
NOW, THEREFORE, BE IT RESOLVED, by the City Commission of the City of Fort Pierce, Florida, that this Commission does hereby adopt the St. Lucie County Local Mitigation Strategy.

IN WITNESS WHEREOF, this Resolution has been duly adopted this 22nd day of February, 2011.



MAYOR COMMISSIONER

ATTEST:



CITY CLERK

(CITY SEAL)

RESOLUTION 10-299

A RESOLUTION ADOPTING THE ST. LUCIE COUNTY LOCAL MITIGATION
STRATEGY PLAN

WHEREAS, the Board of County Commissioners of St. Lucie County, Florida, has made the following determinations:


1. The Disaster Mitigation Act of 2000 (DMA2K) requires that all communities, tribes, and states have a Federal Emergency Management Agency (FEMA) approved hazard mitigation plan, consistent with the DMA2K requirements, to retain eligibility for FEMA hazard mitigation grant funding.
2. A FEMA approved hazard mitigation plan is required for the purpose of certifying compliance with the requirements of the National Flood Insurance Rate Program.
3. On August 20, 2010, FEMA found the St. Lucie County Local Mitigation Strategy Plan compliant with federal standards subject to formal adoption.


NOW, THEREFORE, BE IT RESOLVED by the Board of County Commissioners of St. Lucie County, Florida that this Board does hereby adopt the St. Lucie County Local Mitigation Strategy Plan.

Chris Craft, Chairman	AYE
Chris Dzadovsky, Vice Chairman	AYE
Commissioner Tod Mowery	AYE
Commissioner Paula A. Lewis	AYE
Commissioner Frannie Hutchinson	AYE

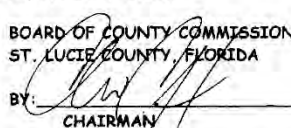
PASSED AND DULY ADOPTED this 23rd day of November, 2010.

ATTEST:


DEPUTY CLERK



BOARD OF COUNTY COMMISSIONERS
ST. LUCIE COUNTY, FLORIDA

BY: 
CHAIRMAN

APPROVED AS TO LEGAL FORM AND
CORRECTNESS:


COUNTY ATTORNEY

RESOLUTION 2011-1

A RESOLUTION OF THE TOWN OF ST. LUCIE VILLAGE, FLORIDA
ADOPTING THE ST. LUCIE COUNTY LOCAL MITIGATION STRATEGY
PLAN.

WHEREAS, the Board of Alderman of the Town of St. Lucie Village
(the Village), Florida, has made the following determinations:

1. The Disaster Mitigation Act of 2000 requires that all
communities, tribes, and states have a Federal Emergency Management
Agency (FEMA) approved hazard mitigation plan, consistent with the
Act's requirements, to retain eligibility for FEMA hazard mitigation
grant funding.
2. A FEMA approved hazard mitigation plan is required for the
purpose of certifying compliance with the requirements of the National
Flood Insurance Rate Program.
3. On August 20, 2010, the Florida Department of Emergency
Management, (FEMA), found the St. Lucie County Local Mitigation
Strategy Plan compliant with Federal Standards subject to formal
adoption.

NOW, THEREFORE, BE IT RESOLVED by the Board of Aldermen of the
Town of St. Lucie Village, Florida that this Board does hereby adopt
the St. Lucie County Local Mitigation Strategy Plan.

IN WITNESS WHEREOF, this Resolution has been duly adopted this
18th day of January, 2011.

APPROVED:
BOARD OF ALDERMEN OF THE TOWN OF
ST. LUCIE VILLAGE, FLORIDA

By: William G. Thiess
William G. Thiess, Mayor

ATTESTED:
By: Diane C. Orme
Diane C. Orme, Clerk

I, DIANE C. ORME, Clerk of the TOWN OF ST. LUCIE VILLAGE, FLORIDA,
do hereby certify that this is a true and accurate copy of Resolution
2011-1 which was duly introduced, read and adopted at the regular
meeting of the Board of Aldermen of the TOWN OF ST. LUCIE VILLAGE,
FLORIDA, held this 18th day of January, 2011.

Diane C. Orme
DIANE C. ORME, CLERK

APPENDIX G

REFERENCES

Associated Press, Local news, TC Palm.com, 1998. *Treasure coast crop damage from Mitch put at \$20 million.* <http://www.tcpalm.com/news/tcoast/v08sflmi.shtml>

[Bureau of Business and Regulation \(BEBR\) 2016 County Demographic Profile: 2014, 2015, 2020 St. Lucie County and Municipal Population Estimates; Median Income and income projections; Age, Race and Education.](#)

Center for Disease Control (CDC):

- Flu activity during the 2013-2014 season: <http://www.cdc.gov/flu/pastseasons/1314season.htm>
- 2014 Ebola outbreak in West Africa.

CAMEO (Computer Aided Management of Emergency Operations); 2015 Risk & Vulnerability Analysis; List of Extremely Hazardous Substances (EHS) chemicals, St. Lucie County

Encyclopedia Britannica, September 2014. *Deepwater horizon oil spill of 2010.*
<http://www.britannica.com/EBchecked/topic/1698988/Deepwater-Horizon-oil-spill-of-2010>

Enterprise Florida, Florida Economy Data Center, 2014: St. Lucie County Industry and Employment Profile <http://www.enterpriseflorida.com/data-center/florida-economy/>

Enterprise Florida, 2016. *St. Lucie County Profile:* <http://edr.state.fl.us/content/area-profiles/county/St.Lucie.pdf>

Environmental Protection Agency (EPA). 1998. *Oil Program Overview:* <http://www.epa.gov/oilspill/>

Federal Emergency Management Agency (FEMA), January 2013. *Mitigation ideas: a resource for reducing risk to natural hazards.* [http://www.fema.gov/media-library-data/20130726-1904-25045-2423/The Department of Public Safety_mitigation_ideas_final_01252013.pdf](http://www.fema.gov/media-library-data/20130726-1904-25045-2423/The%20Department%20of%20Public%20Safety_mitigation_ideas_final_01252013.pdf)

Federal Emergency Management Agency (FEMA), March 2013. *Local mitigation planning handbook.* <https://www.fema.gov/media-library/assets/documents/31598>

Federal Emergency Management Agency: 2011, *Fact Sheet: Radiological Emergency Preparedness (REP) Program.* Retrieved from: http://www.FEMAgov/pdf/media/factsheets/2011/repp_factsheet.pdf

Federal Emergency Management Agency (FEMA) , 2011. *Know your Tsunami Terms:* [http://www.The Department of Public Safety.gov/hazard/tsunami/ts_terms.shtml](http://www.The%20Department%20of%20Public%20Safety.gov/hazard/tsunami/ts_terms.shtml)

Federal Emergency Management Agency (FEMA); *Community Status Book Report, Florida; April, 2016:* <https://www.fema.gov/cis/FL.html>

Federal Emergency Management Agency (FEMA); *Community Rating System Eligible Communities;* May 2014: http://www.fema.gov/media-library-data/13988788921025cbcaa727a635327277d834491210fec/CRS_Communities_May_1_2014.pdf

Florida Department of Agriculture and Consumer Services, 2002. *The Mediterranean fruit fly, Ceratitis capitata* (WiedThe Department of Public Safetynn)(Diptera: Tephritide
<http://www.freshfromflorida.com/Divisions-Offices/Plant-Industry/Plant-Industry-Publications/Pest-Alerts/Pest-Alerts-The-Mediterranean-Fruit-Fly>

Florida Department of Agriculture and Consumer Services: 2012,
<http://www.freshfromflorida.com/#Agriculture-Industry>

Florida Department of Children and Families: 2006, *Annual Report on Homeless Conditions in Florida*:
<http://www.dcf.state.fl.us/programs/homelessness/docs/2006reportweb.pdf>

Florida Department of Environmental Protection (FDEP): 2014, Critical Erosion Areas in Florida
<http://www.dep.state.fl.us/beaches/publications/pdf/CriticalErosionReport.pdf>

Florida Department of State, Division of Historical Resources: 2016,
<http://dos.myflorida.com/historical/>

Florida Division of Emergency Management (FDEM) (2014), *Florida Hazard Watch*:
<http://floridadisaster.org/EMTOOLS/wildfire/wildfire.htm>

Florida Forest Service (n.d); n2016,

- *Current Fire Conditions*. <http://www.freshfromflorida.com/Divisions-Offices/Florida-Forest-Service/Wildland-Fire/Current-Fire-Conditions>
- *Firewise Communities*. <http://www.firewise.org/wildfire-preparedness.aspx>
- *When Nature is Your Neighbor, Landscaping to reduce your wildfire risk*.
http://freshfromflorida.s3.amazonaws.com/South_Florida_Firewise_Landscaping_Guide.pdf

Florida Inland Navigation District: <http://www.aicw.org/index.jsp>

Florida Inland Navigation Division: 2001. *An economic analysis of the district's waterways in St. Lucie County*. http://webserver.martin.fl.us/GOVT/depts/psd/tp_exs.pdf

Florida Power and Light: 2015. *Improving our systems*. <https://www.fpl.com/reliability/system-improvements.html>

Florida State Emergency Response Commission. April 2016. *Hazardous Materials Incident Reports*.
<http://www.floridadisaster.org/hazmat/serc/documents/2015-aprilsercpackage.pdf>

Johnston, W.R., (2005), *Review of Fall 2001 Anthrax Bio attacks*:
<http://www.cdc.gov/niosh/nas/rdrp/appendices/chapter6/a6-45.pdf>

Legendre, B.L., M.A. Clarke, M.A. Godshall, and M.P. Grisham. 1998. *Developments in sugarcane agriculture that affect processing*:
http://agricola.nal.usda.gov/cgi-bin/Pwebrecon.cgi?Search_Arg=developments+in+sugarcane+agriculture+that+affect+processing&SL=None&Search_Code=TALL&PID=I5tVJaFfs5YOF4AFGMeq8WxwTvvd&SEQ=20150322203837&CNT=25&HIST=1

National Climatic Data Center (NCDC). 2004. Storm event database:
<http://www.ncdc.noaa.gov/oa/climate/severeweather/extremes.html>

National Climatic Data Center, National Oceanic and Atmospheric Administration, Storm Event Database: <http://www.ncdc.noaa.gov/stormevents/eventdetails.jsp?id=5424910>

National Conference of State Legislatures: 2003, *Economic impacts of September 11th on New York City*: <http://www.ncsl.org>

National Drought Mitigation Center. 2015: <http://drought.unl.edu/>

National Hurricane Center. 2013: <http://www.nhc.noaa.gov/>

National Lightning Safety Institute: 2015: http://www.lightningsafety.com/nlsi_ills/fatalities_us.html

National Oceanic and Atmospheric Administration, National Weather Service (NOAA, NWS). 1994. *Thunderstorms and lightning. The underrated killers! A preparedness guide*:
<http://www.crh.noaa.gov/grr/skywarn/brochures/nwsthunderstorms&lightning.pdf>

National Severe Storms Laboratory, National Oceanographic and Research Center, (n.d.)
Publications: <http://www.nssl.noaa.gov/papers/techmemos/NWS-SR-193/techmemo-sr193-3.html#section3b>

National Weather Service (NWS). 2013. *Florida thunderstorm wind-related deaths (1940-2013)*:
http://www.nws.noaa.gov/os/hazstats/resources/weather_fatalities.pdf

National Wildland/Urban Interface Fire Protection Program. 1997. *Wildland/urban interface fire hazard A New Look At Understanding Hazard Assessment Methodologies*:
<http://www.firewise.org/~media/Firewise/Files/Pdfs/Booklets%20and%20Brochures/BookletWildlandFireHazards.pdf>

NOAA / National Hurricane Center: 2015: <http://www.nhc.noaa.gov/>

NOAA / National Weather Service: 2014: <http://www.weather.gov/>

NOAA. 2015. *Storm Spotter Resource Center*: <http://www.srh.noaa.gov/oun/?n=spotter>
Mitigation Directorate: Washington, DC: p. 2. *Partnerships for Building Safer Communities*.
Rappaport, E. 1993; *Preliminary report. Hurricane Andrew 16 - 28 August, 1992*:
<http://www.nhc.noaa.gov/1992andrew.html>

Seven Counties/ 50 Years: 2013, *Analysis of the Vulnerability of St. Lucie County to Sea Level Rise*:
http://ap3server.martin.fl.us/web_docs/gmd/web/comp_planning/aid_special_projects/aid_Seven50/20_MC_Vulnerability_to_Sea_Level_Rise.pdf

Southern Group of State Foresters (2014): *GoodFires*, www.goodfires.org

St. Lucie County Department of Public Safety, Division of Emergency Management: 2013,

- *Comprehensive Emergency Management Plan. Plan (CEMP)*
- *Shelter Management Plan*
- *Continuity of Operations Plan (COOP)*

St. Lucie County Growth Management Department: 2013, *Residential Capacity and Vacant Land Analysis*; 2012 Comprehensive Plan.

St. Lucie County Metropolitan Planning Organization: 2016, *2025 Transportation Plan*.

St. Lucie County Office of the County Administrator: 1999, *Level of service analysis - Public Buildings*.

Treasure Coast Regional Planning Council: 2016

- 2012 Treasure Coast Regional Vulnerability Study: Sea Level Rise & Storm Surge Cat 3 & 5
- 2010, 2013, 2015 Treasure Coast Regional Evacuation Study: Volume 1, 4 and 5 Hazards & Vulnerability, Transportation and Demographics
- Local Emergency Planning Committee (LEPC); Hazardous Materials Response Plan; St. Lucie County EHS Facilities
- Strategic Regional Policy Plan (SRPP)

UF-IFAS Citrus Extension; 2013: <http://www.crec.ifas.ufl.edu/extension/>

United States Army Corps of Engineers (ACOE): 1999, *National Inventory of Dams*:

http://www.publications.usace.army.mil/USACEPublications/EngineerPamphlets.aspx?udt_43545_param_pa_ge=2

United States Census Bureau 2010 Census: *American Factfinder*, <http://www.census.gov>

United States Department of the Interior, United States Geological Survey (US DOI, USGS); 2015, *Earthquake history of Florida*: <http://earthquake.usgs.gov/earthquakes/states/florida/history.php>

University of Florida (2012): *Fire in Florida*, <http://fireinflorida.ifas.ufl.edu/landscaping.html>

University of Florida, IFAS: 2007, *Management of Tomato Yellow Leaf Curl Virus (TYLCV)*:

<http://edis.ifas.ufl.edu/pdf/NF/NFREC100.pdf>

US Department of Homeland Security: <http://www.ready.gov/>

United States Geological Survey (USGS) Tsunamis and Earthquakes, (n.d.):

<http://walrus.wr.usgs.gov/tsunami/CIHH.html>

Weather Underground (n.d.),

- *Enhanced Fujita Scale*: http://www.wunderground.com/resources/severe/fujita_scale.asp
- *Hurricane Archive*: <http://www.wunderground.com/hurricane/hurrarchive.asp?MR=1>